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THE MEDICAL TREATMENT OF PNEUMONIA.¹

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STRICTLY speaking, pneumonia is an inflammation of the lung; it may be bacterial, chemical, mechanical or traumatic in origin; it may be acute or chronic, primary or secondary.

Diverse as are the clinical and pathological aspects of pneumonia, and however difficult the classification of such inflammatory diseases of the lung may be, if we exclude the broncho-pneumonias of young children and the pneumonias secondary to other illnesses, there remains a group of cases, in which a severe pyrexial illness (with sudden onset

and a tendency to recovery by crisis in non-fatal cases) is associated with signs and symptoms of pulmonary involvement. In this group bacteraemia is frequently present during the initial stages of the infection, and is a constant feature in severe and fatal cases. Infections of this type are, with very few exceptions, caused by the pneumococcus; such infections are usually clinically known as lobar pneumonia.

Pneumonia thus defined is a disease of some importance, being responsible for 390 deaths in South Australia in 1935. The incidence in the community is difficult to assess, but in the ten-year period from 1927 to 1936, 3,989 persons were treated in the Adelaide Hospital for pneumonia of some kind, the total deaths being 1,560. Not all these deaths can be ascribed to the pneumonia itself, as included in these figures are cases of pneumonia secondary to other diseases; this latter group is responsible for 1,013 deaths.

¹ Read at a meeting of the South Australian Branch of the British Medical Association on September 25, 1937.

Broadly speaking, over this ten-year period 1,376 persons were treated for lobar pneumonia, the mortality rate being 20%; 1,015 persons suffered from bronchopneumonia, with a death rate of 25%. These figures compare favourably with those of Great Britain and America, where the mortality varies from 20% to 25% and from 30% to 33% respectively. The mortality in all countries increases with age.

If we collate the available experimental evidence with the clinical observations on the course of the disease in man, we can construct a picture of the sequence of events which, although incomplete, will aid us in the evaluation of the results obtained from serum and other treatment.

It would appear that the initial phase of the infection is marked by a progressive invasion of the lung tissue, and is frequently associated with a detectable bacteriæmia. The inflammatory reaction in the lung progresses through its successive stages, and the bacteriæmia may or may not increase in severity. At some time between the fourth and seventh days, in favourable cases, specific antibodies begin to appear in the blood; and coincidentally with their appearance the temperature falls by crisis, the pneumococci disappear from the blood (if they were ever present in detectable numbers) and the clinical condition of the patient undergoes a striking amelioration, although abnormal signs may persist in the lungs for weeks.

There are good grounds for believing that the degree or persistence of bacteriæmia, rather than the local condition in the lungs, is the main factor in determining death or recovery. In acute cases ending fatally the lung changes at autopsy may be relatively slight, but blood cultures taken during life are in such cases almost always positive. It must, however, be realized that a patient may survive the primary pneumococcal infection, the initial bacteriæmia may subside, and yet the patient may die from the effect of empyema or some other secondary focus of infection.

Most cases of pneumonia are caused by a few well-differentiated serological types; the frequency with which such types occur varies at different times and places. Types I and II are the commonest, type III is the most fatal, and group IV is not a distinct type, but consists of a heterogeneous collection of different strains. Pneumonia due to organisms of Group IV tends to have a lower case mortality than that caused by any of the other types.

After this rather sketchy pathological and bacteriological preamble, we may deal with the treatment of the individual patient.

The treatment of pneumonia is beset with pitfalls for the unwary and the ultra-enthusiastic. The recent bacteriological advances, culminating in the classification of pneumonias according to the type or group to which the organism responsible for the disease belongs, have tended to focus the attention of the physician on the type of pneumonia rather than on the patient. It must be emphasized that, in spite of any advance in knowledge of the ætiology of pneumonia, the resistance of the host is

the dominant factor in his recovery or demise; the conservation of the patient's strength by ministering to his comfort is all-important; and it is skilled nursing that saves life in doubtful cases. No apology is made, therefore, for any stress that may be laid on efficient nursing.

Isolation.

The contagious nature of pneumonia is now recognized as a large factor in the spread of the disease, and many cases of pneumonia the origin of which was hitherto unexplainable can be shown to have resulted from contact with other cases.

One of the main ways by which the disease is spread is droplet infection; and in this connexion it is mentioned that, in ordinary conversation, infected material may be projected a distance of four feet, and in coughing and sneezing it may be projected up to ten feet. The necessity for care on the part of the medical and nursing attendants is obvious; equally important is it to refrain from nursing pneumonia patients in over-crowded wards. The routine of isolation is similar to that of other infectious diseases: the nurse should wear a cap that completely covers her hair, and a gown while attending to her patient, and she must thoroughly scrub her hands on leaving him. Saline mouth washes are useful in prophylaxis, as also are solutions of quinine, such as the bisulphate in a strength of one in 10,000 with *liquor thymolis* diluted one in ten. The patient should have separate dishes; all sputum should be collected on old lint or on paper handkerchiefs, and burnt. Bedding and linen should be disinfected at the termination of the illness. Above all, a nurse or a physician with respiratory catarrh has no place in the sick room.

Attention to these details will limit contagion; in twelve years' hospital experience I have seen few cases of pneumonia due to the spread of infection to other ward patients or to the nurses, except in certain years when the pneumonia appeared to be influenzal in type.

Nursing.

Every patient seriously ill should have a special nurse; in private homes there should be at least two nurses, in order to ensure them adequate rest and recreation. The room should be bright and airy, well ventilated, but free from draughts; the light should not be bright enough to disturb the patient, but should be sufficient to allow of easy recognition of any change of colour and expression. The bed should be narrow and away from the wall, and the mattress must be firm; narrowness of the bed facilitates nursing, and allows of the use of a bedside table straddling the bed, on which can be kept a sputum cup, pieces of lint, a glass of water *et cetera*.

The patient should be nursed in the position he finds most comfortable, the position being changed from time to time to prevent undue congestion and stagnation in dependent parts. Nowhere is custom more slavishly followed than in insistence upon Fowler's position, and no sight is more distressing

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than that of a patient, desperately ill, clinging precariously to his upright position; his pillows will slip no matter how carefully they are arranged, and his back and neck muscles ache from the unaccustomed strain. Further, patients seriously ill with pneumonia are in a condition of medical shock, a state closely analogous to surgical shock; no practitioner would dream of nursing a patient with the latter condition in Fowler's position, yet few stop to consider the discomfort, if not the actual harm, that may be occasioned by insistence on this posture in pneumonia.

Sheets next to the patient are preferable to blankets, as they do not irritate the skin, and can easily be washed if they become soiled by sputum or spilt medicaments. Pyjamas (changed as soon as they are moist), are more suitable than garments which do not open down the front, and a nightgale serves to keep the shoulders warm. A hot water bag to the lower part of the body and limbs is comforting; examinations of the patient's chest should be reduced to a minimum, once the diagnosis is made; daily auscultation of the back adds nothing material to the information at hand, and merely distresses the patient. The heart can be examined and the abdomen palpated by simply opening the garment in the front, with the minimum of discomfort to the patient. Further, as the essence of treatment is the conservation of the patient's strength, he must do nothing for himself; the nurse must be constantly in attendance.

How often have we seen a patient racked by a fit of coughing, sitting bolt upright in bed, grasping the sputum cup in both hands; he has, after much effort, succeeded in getting into his mouth the viscid lump of sputum that has caused his paroxysm, but he cannot expel it, it clings tenaciously to his lips. Exhausted and in desperation, he endeavours to pick the sputum from his lips with his fingers and flick it into the sputum cup. This spectacle is unedifying; it is the antithesis of sanitation and cleanliness; and it is extremely exhausting to the patient.

Visitors should be reduced to the minimum. Few people have learnt the art of visiting the sick; they cannot converse in a monologue, but insist on asking question after question of the patient, which demands concentration on his part and the formulation of suitable replies. It is a process which is fatiguing in the extreme, and few patients are benefited by visiting days.

Before this question of conserving the patient's strength is disposed of, a plea is entered for more serious consideration by the practitioner of the possibility of nursing a patient in his own home rather than dispatching him immediately to hospital. Admittedly, in the patient's own home nursing and sanitary facilities are often sadly lacking, and on this account admission to hospital offers the only chance of saving his life; but the conveyance of a seriously sick patient from his own home to a public, or private, hospital involves much handling and chilling on the journey. It is surprising to see the rise in temperature that almost

invariably occurs, in the hour or so following the admission of a sick person to hospital.

Sponging should be carried out once daily; sweats may require dry rubbing and a change of bed and personal linen; the care of the back and of pressure points must not be forgotten. Friction with methylated spirits or "Eau de Cologne", followed by the application of a dusting powder, is generally sufficient.

Cleanliness of the mouth is of extreme importance. In many cases pneumonia follows infection of the upper respiratory tract; mouth breathing is common, being frequently due to nasal occlusion. The dry, dirty oral cavity and the "stuffed up" nose are potential dangers, in that they may be the sites of reinfection or of superinfection. Parotitis may also follow on a dry mouth. Cleansing of the mouth with a pledget of cotton wool and baking soda is refreshing, improving the sense of taste, and leading to increased fluid intake. Ephedrine in oil or "Endrine" is satisfactory as a nasal spray, and should be used frequently; "Vaseline" or cold cream should be applied to the lips and to any herpetic vesicles.

As the disease is of relatively brief duration, the maintenance of an adequate caloric intake is not of major importance, but a high fluid intake (five to eight pints per day), is desirable. An adult should have 50 to 60 grammes of protein per day, and at least 2,000 calories. Variety and small and frequent sips of food increase the intake; the patient must be fed until he is convalescent.

Milk usually figures prominently in the diet in spite of the dictum of Hippocrates that it increases abdominal distension; a quart a day is sufficient, taken raw or incorporated in soups, custards or ice cream. Plain water, normal saline solution, soda water and thin soups make up the rest of the fluid intake. Glucose is invaluable, flavoured with orange, lemon or pineapple juice, and should be pushed. Benger's food and "Digestin" are usually well taken; coffee, hot and strong, given by the bowel, supplies fluid and heat, and is a valuable stimulant in unexpected collapse. Eggs may be served in the form of egg flip and, together with the milk, make up the required protein.

The care of the bowels should not be elevated to a position of major importance; provided that abdominal distension remains absent, no harm will ensue if the bowels are not open for a week. Should discomfort arise from distension, it may be relieved by the passage of a rectal tube or by the administration of a glycerine and oil enema. Pronounced distension must be looked on as paralysis of the gut, and in this respect is comparable to the dilatation of the vessel walls resulting from toxæmia and so often giving rise to fatal circulatory failure. Such distension leads to serious embarrassment of the movement of the diaphragm, with consequent lessened aeration of the blood. Treatment is often ineffectual, but chief reliance is placed on the rectal tube, which is left *in situ*, and on four-hourly injections of "Pituitrin" (1.0 cubic centimetre) and "Eserine", 0.001 gramme (one-sixtieth of a grain).

The efficacy of turpentine stupes is doubtful. Retention of urine seldom occurs, but if necessary resort must be had to catheterization.

Medicinal and Other Treatment.

At some stage or other pleural pain demands relief. In the robust, and, in fact, in all but the extremely debilitated patient, nothing equals a hypodermic injection of 0.011 gramme (one-sixth of a grain) of morphine, given three or four times in the day, and this drug may be given freely to any patient in the absence of cyanosis or pulmonary oedema. The pain is aggravated by paroxysms of dry, hard coughing, which bring up small quantities of viscid sputum; this cough must be soothed by a sedative linctus such as *linctus morphinae*, *linctus heroini*, et cetera, given as necessary. Incidentally, the patient should have within easy reach a sputum mug and pieces of old lint or gauze with which to wipe from his lips the sticky, viscid sputum.

External medicaments, such as plasters, pastes and poultices for the relief of pain, are in my opinion not worth the discomfort to which the patient is subjected in their application. Nothing could be worse than a heavy linseed poultice on the chest of a wasted woman or a puny child. Poultices and plasters rapidly lose their heat and are then only an encumbrance; the annoyance to the patient in their application and removal is considerable.

Artificial pneumothorax has been advocated as a means of relieving pain and, further, by compressing the lung, of controlling toxæmia. Of this method of treatment I can claim no personal experience, but perusal of the literature suggests that, although pain may be alleviated, the toxæmia is not necessarily diminished, nor is the disease shortened. In addition, the method may not be without danger, in that, by compression, infected material may be squeezed from one lung into the other, and a unilateral converted into a bilateral condition. Again, should an empyema occur in the course of the disease, encystment would be rendered more difficult by the presence of a pneumothorax; some observers have noted cyanosis and increased respiratory distress in patients so treated.

Dyspnoea and cyanosis may be ascribed to oxygen lack; it is possible that changes in cardiac rate and mental symptoms may be in part due to the same cause. Oxygen administration should be commenced as soon as dyspnoea, cyanosis, rising pulse and respiratory rates, and delirium make their appearance. This gas may be given by nasal catheter, by face mask or by oxygen tent, the last method being probably the most satisfactory. Unfortunately, however, the placing of the tent over the face and shoulders is apt to excite apprehension on the part of the patient, and resort is made to the nasal catheter. If a tent is used, the concentration of oxygen should be about 50%; higher concentrations over long periods may produce widespread injury to lung tissue. A flow of oxygen of six to eight litres per minute is sufficient to secure the requisite concentration of the gas. A word of warning must be inserted here as to the danger of

bringing candles or lamps close to the oxygen tent, for although oxygen is non-explosive, bedding and linen will in the vicinity of concentrated mixtures of oxygen and air burn with amazing rapidity.

Most patients object to the tight-fitting oxygen face mask, consequently it is rarely used. Administration by nasal catheter requires the use of a Woolffe's bottle in order that the flow of gas may be observed and the gas warmed. This method is less satisfactory scientifically than the tent, for it is difficult to secure a flow of five litres per minute without blowing the catheter out of the nose; it is, however, the method most generally adopted and is, despite the reduced flow, of immense benefit.

Mental rest and sleep are essential; probably sleep is the most vital need of the patient, and no treatment should be allowed to interfere with it. In the absence of pain, sodium amylal in doses of 0.195 gramme (three grains), repeated if necessary, generally secures six hours' rest. Chloral hydrate, in doses of 0.975 to 1.3 grammes (15 to 20 grains) and paraldehyde in doses of 3.9 grammes (one drachm), repeated if ineffective, are useful. To those accustomed to it, brandy in tablespoonful doses is comforting. Sleeplessness from pain, however, generally requires morphine for its relief.

Circulatory failure is ascribed with less frequency than formerly to intrinsic heart disease. For those patients who suffered from valvular disease with disturbance of rhythm or from cardiac oedema before the supervention of pneumonia, digitalis is obviously indicated either as the tincture or as Nativelle's granules; 0.00027 gramme (one-two hundred and fortieth of a grain) should be given six hourly. Similarly, should auricular fibrillation appear during the course of the pneumonia, digitalis should be employed; coupled beats will suggest that the drug should be withdrawn temporarily.

Venesection is seldom practised now, but for patients with high blood pressure in the early stage of the disease, and for those with pronounced cyanosis and right heart failure later on, it is quite good treatment.

In many patients circulatory failure is due to a condition that may be termed medical shock, namely, a widespread dilatation of capillaries and small veins. It is an extremely grave condition and is often the cause of death. The temperature may not be low, but the face is ashy grey, the skin is clammy and the pulse is running. Some observers maintain that it is due to vasomotor paralysis, others that it is due to direct toxic action on the capillary walls. Drugs are seldom helpful in this condition, but adrenaline, "Pituitrin" and "Coramine" are sometimes of use. Adrenaline is theoretically the best drug, but unfortunately its action is extremely fleeting. Alcohol, though often prescribed, is of very doubtful value in any stage of the disease.

The matter of specific treatment has been left till the last, for although theoretically it should be the first line of attack, practically it has proved to be of value in only a few selected cases.

The Therapeutic Trials Committee of the Medical Research Council published a report of their con-

clusions in *The British Medical Journal* in 1934, and, in spite of the time that has since elapsed, nothing of great value has since been added.

Their conclusions are as follows:

1. Concentrated antiserum for type I pneumonia reduced the fatalities in Type I cases of lobar pneumonia in adults between the ages of twenty and forty years, but it had little effect in reducing the mortality in older patients. Treatment seemed to reduce the average duration of fever and illness in patients who recovered, and there was a suggestion that it decreased the liability to empyema in the survivors.

2. Similar effects were seen if Type II serum was used for Type II lobar pneumonia.

3. Immediate serum reactions of a dangerous nature were seldom seen, except that some batches of serum caused rigors and collapse. No late anaphylactic results were experienced.

4. The benefits of serum treatment are not so emphatic that all severe cases of lobar pneumonia, irrespective of the type of pneumonia, should be treated with Type I or Type II antiserum on the off chance that they might be benefited; special technique for repeated intravenous injections, and the cost of the serum, make the treatment unsuitable for universal application. Each case must be typed as soon as possible so that the appropriate serum can be used. The use of serum is not recommended unless the type can be found.

5. If typing is possible, withhold the use of serum till the type is established, then give 20,000 units of Felton's serum of appropriate type. If more time is required for typing, give 20,000 units of Type I and 20,000 units of Type II serum, and continue with the appropriate serum when the type is known. Give 20,000 units at a time twice daily at eight-hourly intervals. The amount of serum used in the individual case is usually 80,000 units; if there is no obvious clinical improvement in forty-eight hours it is useless to continue.

6. Give the serum intravenously; there is no satisfactory preliminary test for sensitiveness to horse serum. Give the first injection slowly and cautiously, injecting one cubic centimetre into the vein in the first minute or two and taking ten to fifteen minutes to inject the total amount. Adrenaline (1 in 1,000 solution) should be kept in readiness for untoward symptoms, and half to one cubic centimetre must be given subcutaneously if the patient collapses with weak pulse and dyspnoea. A second injection of serum may be given with less precaution.

7. Serum is of doubtful value in children, in persons over sixty and in patients with bronchopneumonia.

A symposium recorded in *The British Medical Journal*, 1936, added little to the foregoing beyond pointing out that dramatic improvement sometimes occurred in patients treated with serum in the first twenty-one to forty-eight hours; that serum should be given early and in large doses; that Type I infections occurred in the relatively young and the prognosis even without serum was better than in all other type infections; that serum had to be given only in those Type I infections in which the prognosis was anxious. Type II infections were toxic and all required to receive serum. Type I and Type II sera were of proven value, and needed to be given in all cases in which it was necessary to exploit every remedy to achieve a cure.

German and American workers write enthusiastically of the results of serum treatment, provided it is given early. The Americans use huge doses, 150,000 units initially and 100,000 units every six hours; the Germans use small doses.

The consensus of opinion is that serum is useless in pneumococcal sepsis.

Practically, from the hospital standpoint, few patients are admitted before the fourth day of illness; serum therapy, therefore, could not be expected to be successful. Moreover, the cost of the American treatment militates against the experimental use of serum.

I have had no experience in the use of the mixed pneumococcal, streptococcal and influenzal vaccine, and little information is to be found in the literature.

Complications.

Pleurisy is the invariable accompaniment of pneumonia when the lung lesion reaches the pleural surface; it may be fibrinous, serous and purulent. Dry pleurisy is treated symptomatically. Serous effusions resulting in mediastinal displacement are aspirated; purulent effusions are dealt with surgically.

Pericarditis when it occurs may be fibrinous and seropurulent. The fibrinous type is treated expectantly, as is the serous type, unless the muffling of the heart sounds and the smallness of the pulse, together with the increase in cardiac dullness, demand aspiration. Purulent pericarditis is treated surgically.

Some degree of myocarditis is almost always present, the more severe grades demanding strict rest and adequate nursing for lengthy periods. Endocarditis is a grave complication, often resulting in embolism. The treatment is purely expectant.

Meningitis is fortunately uncommon, being invariably fatal. Serum is valueless; frequent lumbar puncture and morphine for the intense headache are, however, of value.

Delayed resolution is fairly common, and it is a matter of wonderment that in so few cases does the lung fail to return to its normal state. Moist sounds may persist for weeks, but do not always mean a continuance of the inflammatory condition. Some of these cases are definitely mechanical in origin, and improve when the patient is allowed up and about. Continuance of fever always suggests tuberculosis, empyema or lung abscess, and examinations directed to the discovery of the cause of the fever must be undertaken and appropriate treatment instituted. Lung abscess is uncommon, and is treated expectantly or by bronchoscopic measures.

Arthritis, peritonitis, *otitis media* and parotitis are uncommon and demand surgical measures for their relief.

Thrombosis of the femoral and other veins occasionally occurs in protracted cases, and demands rest in bed with immobilization of the leg.

Albuminuria accompanies lobar pneumonia with greater frequency than any other disease; rarely does a patient fail to show, at some stage, albumin in the urine. Fortunately neither this symptom nor jaundice (which is relatively uncommon) seems to increase the gravity of the prognosis, nor does it call for special treatment.

I have seen only one case of acute diabetes complicate pneumonia. The patient, a nurse, reported sick on the fourth day of her illness. On the morning

of the sixth day the urine showed a trace of albumin as the only abnormality, but by night extremely severe ketosis had developed and the urine was loaded with sugar. The patient died the same evening.

Conclusion.

In conclusion, it must be admitted that this paper contains little that is new; it is a matter for infinite regret that specific treatment has proved rather disappointing. Efficient nursing and adequate rest are still the main points in the treatment of pneumonia, and these can be achieved only by meticulous attention to the little things. No apology, therefore, is made for the stress that has been laid on the minutiae of treatment; and perhaps, as a final straw, may I commend for your consideration the provision in the sick room of a bowl of goldfish to while away the many tedious hours of convalescence.

SURGICAL COMPLICATIONS OF PNEUMONIA.¹

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It is my intention to deal this evening only with those complications of pneumonia which call for somewhat specialized surgical treatment. Such complications as *otitis media*, *parotiditis et cetera* will not be discussed, as their treatment after pneumonia in no way differs from the well-known routine methods. I intend to devote the major portion of my time to the discussion of empyema, but I shall also deal briefly with arthritis, pericarditis and peritonitis.

At the outset I should like to make one general statement: do not be in a hurry to attempt major surgical procedures in pneumococcal infections.

Pneumococcal Arthritis.

Pneumococcal arthritis may be quite a serious complication, and it usually occurs in the later stages of a lobar pneumonia. The large joints are commonly affected, the knee probably most of all.

Treatment.—Complete immobility and aspiration of the joint should be tried first. Rest to the part is most essential, and I do not think that this can be satisfactorily obtained by stock sizes in back splints. By far the most satisfactory splint is one made specially for the patient from a plaster of Paris slab. It is made long enough to reach from the top of the thigh to the toes, and it is bandaged to the limb. After the plaster has set the knee area can be exposed to allow of examination and aspiration of the joint without its disturbance. If the joint continues to fill rapidly and the general con-

dition is not improving, then arthrotomy must be performed.

Primary pneumococcal arthritis occurs in the absence of pneumonia and is most frequently seen in children. The entrance of the organisms is usually by way of the throat or ears, and it is generally a large joint which is affected. The prognosis is better in this type than in the secondary variety, and treatment by aspiration will frequently produce a cure.

Pneumococcal Pericarditis.

Pneumococcal pericarditis is a rare complication, and it is usually a local extension of an adjacent empyema. X rays will be found of great help in making the diagnosis, and a pericardial puncture will be confirmatory. Hamilton Bailey says that pericardial puncture should not be done to confirm the diagnosis, as the danger of *paracentesis pericardii* is greater than that of exploratory operation. However, he does not enumerate the dangers.

Treatment.—It has been my good fortune to treat one patient with pneumococcal pericarditis and he made a good recovery; treatment was by repeated aspiration. The needle was inserted in the fifth left intercostal space, about 2.5 centimetres (one inch) from the border of the sternum, to avoid injury to the internal mammary artery. In this case the fluid withdrawn was frank pus, and a cure resulted. As quite a number of pericardial effusions may be simply serous in nature, immediate pericardiectomy seems to me rather drastic. I think I shall be inclined to try aspiration first when the next case arrives.

If pericardiectomy is decided upon, it is best carried out by trephining the sternum immediately above the gladiolo-xiphisternal junction and enlarging the opening a little to the left of the mid-line. The pericardium beneath this area is uncovered by pleura, and an opening is made directly into it. The opening is enlarged by the finger and a soft rubber tube is inserted for drainage.

Secondary Pneumococcal Peritonitis.

Secondary pneumococcal peritonitis following an attack of pneumonia is usually rather mild, and it tends to become localized.

Treatment.—Operation should be delayed until localized abscesses develop, and these should be drained as they arise.

Primary Pneumococcal Peritonitis.

Primary pneumococcal peritonitis is quite a different matter. It occurs most frequently in girls aged between two and ten years, the commonest age being five years. There is some difference of opinion concerning the portal of entry, many believing that it gains access through the vagina and the Fallopian tubes.

Treatment.—If the peritonitis is undoubtedly pneumococcal, then immediate operation is contra-indicated. Time is given for the infection to become

¹ Read at a meeting of the South Australian Branch of the British Medical Association on September 25, 1937.

localized, and then the local collections of pus are drained. The mortality with any form of treatment is extremely high, but the delayed treatment offers the best chance.

The diagnosis from peritonitis due to a ruptured appendix is often extremely difficult. Peritoneal puncture and examination of the fluid, or a small exploratory incision in the right iliac fossa should be carried out in cases of doubt. If the appendix is not at fault (it will always be injected on account of the peritonitis) a drainage tube is inserted and the child is returned to bed and treated in Fowler's position, in the hope of localization occurring. Serum has not proved of any particular value.

Empyema.

Whilst all are agreed that the treatment of *empyema thoracis* consists in the removal of the pus from the pleural cavity, the following important points influence the method used:

1. *The Stage of the Pneumonia at which the Empyema Develops.* Empyema occurring whilst active trouble is still present in the lung (syn-pneumonic) carries with it much graver risks than the type which occurs after the active process in the lung has subsided (post-pneumonic).

2. *The Type of Infecting Organism.* The prognosis in the case of the streptococcal form of infection is not nearly as good as in that caused by the pneumococcus. The streptococcal variety tends to the syn-pneumonic form, whilst the pneumococcal is usually post-pneumonic.

3. *The Age of the Patient.* Age is a big factor in probable recovery; empyema is particularly fatal in the extremes of age. The American mortality figure for the first two years of life was 35.8%, it being exactly double that for cases occurring in the first twelve months. Since the improvement of knowledge concerning the pathology of empyema and the mechanics of thoracotomy, the mortality figure over this age period has been greatly lessened. Dr. McEachern, of Winnipeg, by his closed method of drainage, gives us his mortality figures for children under two years of age as 9.52%; and of his series of 75 cases, ranging in age from four months to eleven years, he has the remarkable figure of 2.66% mortality.

The following principles were laid down by Dr. McEachern in his article on empyema in *The British Journal of Surgery*, Volume XX, April, 1933: (i) The operation to provide drainage must be delayed long enough for the lung to become firmly adherent, in order that lung collapse may be prevented when the thorax is opened. (ii) The more acute stage of the illness should be over and there should be improvement in the general condition before the child is subjected to operation.

The all-important fact to decide is whether the adhesions between chest wall and lung are of sufficient strength to prevent collapse of the lung, with its accompanying mediastinal flap, when the chest is opened.

In pneumococcal infections we know that involvement of the pleura occurs comparatively late and adhesions develop quickly, whilst the reverse is true of streptococcal infections. McEachern lays down the following rule as a working basis:

When the organism present is the pneumococcus, thick pus must be present in the pleural cavity for at least a week before the empyema is drained, whilst when we are dealing with the streptococcus thick pus must be present for at least ten days before drainage is undertaken. Whilst waiting the patient is kept comfortable by the removal of the pus by aspiration as frequently as necessary.

These rules are enunciated for the treatment of children, but the same principles hold in adults. However, in adults the times may be shortened somewhat.

Of course, it may not always be your good fortune to know just when thick pus has formed, and for your guidance there is another quite good working rule. Place some of the aspirated fluid in a test tube and allow it to stand for twenty-four hours; if over 75% of the column is solid pus, then adhesions are probably strong enough for drainage.

McEachern's Operation.

I shall now describe in detail the method used by McEachern.

The operation is performed with the child under local anaesthesia, 0.5% "Novocain" being used. A trocar and cannula are used, in which a rubber catheter of about number 18 (French) fits snugly. The cannula is lubricated with glycerine so that no air can enter round the catheter. The trocar and cannula are inserted in the sixth or seventh intercostal space in the posterior axillary line. The trocar is withdrawn and immediately the index finger is placed over the end of the cannula to exclude air. The catheter, which has a lateral eye 1.25 centimetres (half an inch) from the terminal end and is clamped with an artery clip near the other end, is inserted into the cannula so that 3.1 centimetres (one and a quarter inches) of the catheter project into the pleural cavity. The cannula is now removed, care being taken to prevent air from entering the pleural space.

Now comes the very important step of sealing the opening about the catheter. This is accomplished by applying successive layers of absorbent cotton to which collodion is applied with a brush until a collar 12.5 centimetres (five inches) in diameter and 1.25 centimetres (half an inch) thick is built up round the tube. In order that this dressing may adhere firmly to the skin and adjacent catheter, these parts must be thoroughly cleansed and dried with ether. It has been found that the dressing will remain tight longer if the catheter is held immovable in the chest wall. This is accomplished in the following manner. When the dressing is about half applied, a small round needle threaded with a double strand of silk is passed through the wall of the catheter (without entering its lumen) flush with the surface of the dressing. The double thread is then cut, the ends being left about 5.0 centimetres (two inches) in length. A similar thread is passed through the opposite wall of the catheter. These threads are incorporated in the dressing, as this completely and effectively prevents movement. To ensure thorough drying the dressing is fanned for twenty minutes before the child leaves the theatre. To allow the dressing to set more firmly, the catheter is not connected up to the apparatus for the draining of the pus for another three hours. By the removal and reapplication of the clamp the pus can be let out at will.

Irrigation.—Irrigations are begun twenty-four hours after the insertion of the catheter and are repeated every two hours during the day and three times during the

night. The top of the fluid in the container is never more than 45 centimetres (eighteen inches) above the opening in the chest. This assures that the pressure will not rise sufficiently to cause pleural damage or to displace the dressing. Figure I gives details of the apparatus and how it works; it is taken from McEachern's article in *The British Journal of Surgery*.

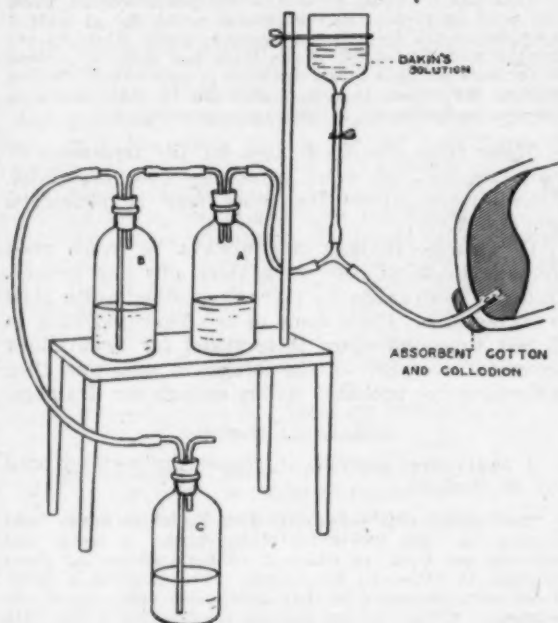


FIGURE I.

Closed drainage in empyema. To irrigate the cavity the rubber tube connecting the Y glass connexion with bottle A is clamped, after which the clamp is removed from the tube connecting the Y with the container for Dakin's solution; when the abscess cavity is filled the solution is clamped off and the clamp between the Y connexion and bottle A removed, allowing the solution to drain off by suction into bottle A. To remove the solution accumulated in bottle A, clamp both rubber tubes leading from the glass connexions in the cork; the cork may then be withdrawn and the bottle emptied without disturbing the siphon. Bottles B and C are interchangeable. When bottle B is nearly empty place a clamp on the rubber tubing between bottles A and B and another clamp in the tube between bottles B and C; the bottles are then changed, the empty one being placed on the floor and the full one on the table.

Warm Dakin's solution is used at 40.5° C. (105° F.). This solution has the power of dissolving fibrinous deposits even after their organization has begun, so preventing the stiffening of the inner wall of the cavity. It also sterilizes the primary infection and prevents a secondary one from developing. The solution is run in until it causes pain or stops from the equalization of pressure. It may be allowed to remain about twenty minutes before being drained away. If the washings are returned tinged with blood, it will probably be advisable to lessen the negative pressure in the pleural cavity by raising the bottle (C) a foot or more off the floor. If blood appears in any considerable quantity, discontinue irrigation for twenty-four hours. In McEachern's experience it has never been a serious complication.

The irrigation may cause a troublesome spasm of coughing. This begins as a rule when the cavity is almost filled, and it can usually be controlled by running the fluid in slowly and stopping just before the critical point is reached. In some cases the coughing may be due to the presence of a bronchial fistula, and then irrigation is discontinued until healing occurs. This usually takes three to seven days.

In some cases of bronchial fistula the opening seems to be somewhat valvular, for, although the irrigating fluid

enters the bronchial tree, air from the bronchus will not enter the cavity and drainage with negative pressure can be continued. When air does enter the cavity, then, of course, negative pressure cannot be obtained and a clamp is placed on the catheter. This is removed every three hours for a short time to allow of the escape of air and discharge. When the fistula heals treatment is continued in the regular way.

In the average case the temperature drops in two to three days, the cavity becomes progressively smaller and the quantity of pus in the washings rapidly diminishes. Usually, when the cavity holds not more than fifteen cubic centimetres of fluid and when the returns have been free from macroscopic pus for five days, drainage can be safely discontinued. On an average this takes about three weeks.

We have used an apparatus somewhat similar to this at the Children's Hospital with success. There is only one difficulty, and that is that the eye of the catheter sometimes becomes plugged with fibrin or thick pus. This does not occur nearly as often as one would expect, no doubt owing to the action of the Dakin's solution in dissolving the fibrinous exudates. Squeezing of the tube or disconnection of the catheter, and injection and withdrawal of the Dakin's solution through it, usually overcome the block.

Drainage by Other Means.

I have described in detail McEachern's method, for it demonstrates the principles involved in closed drainage. The method of which I have most personal experience is perhaps not quite so elaborate and may be more easily carried out by the majority of those present.

With the patient under local anaesthesia, an incision 2.5 to 5.0 centimetres (one to two inches) long is made over the sixth or seventh intercostal space in the posterior axillary line. The intercostal muscles are detached from the lower rib of the space chosen and the pleura is exposed. The pleura is opened and, if pus gushes out, the opening is immediately closed with a swab. If no pus is obtained a piece of rib is resected and the finger put in to explore. Let me mention at this juncture one point of extreme importance: it is a wise procedure, before commencing an operation for empyema, to needle the chest where you propose making your incision. If no pus is obtained, then needle until you find it and open at this point, keeping as near as possible to the above-mentioned areas. When pus is struck, two de Pezzer self-retaining catheters are inserted by means of their stylet. The bulbous ends of the catheters hold them in place just inside the opening and prevent the exit of fluid in any way except down their lumen, which for the time is kept closed by clips. The size of the catheter varies from number 18 French for babies to number 28 for a child of ten years. One of these catheters is used to run in the Dakin's solution, and it can quite conveniently be of much smaller bore than the drainage catheter. An improvement on this two-catheter method is a Tudor-Edwards drainage tube, which is really both catheters in one.

Gauze soaked in liquid paraffin is packed tightly into the wound round the tubes, and a many-tailed

bandage is applied. This dressing is comparatively airtight and need not be touched for days. When the child has recovered sufficiently from the operation the clip is removed from the larger tube and its end is placed under antiseptic lotion in a bottle hanging beneath the bed. In some cases added tubing can be attached to the catheter to enable the bottle to be placed the desired distance from the patient.

This is a very satisfactory method of closed drainage, and irrigation is carried out at similar intervals to those given by McEachern. The cavity is simply washed through, both tubes being open at once, and from half to one pint of Dakin's solution is used each time. Indications for the removal of the tubes are the same as those described above.

Drainage after Rib Resection.

Rib resection is the operation most frequently performed for empyema, and usually proves quite satisfactory, provided sufficient time has been allowed to elapse for the infection to become localized. If adhesions are firm, no untoward symptoms follow simple rib resection and the insertion of a short, wide-bored drainage tube without any special precautions being taken to prevent the entrance of air. However, there is nothing to be gained by this free access of air, and it is probably always advisable to try to limit the amount which enters the pleural space. This can be accomplished by attaching a further piece of tubing to that inserted into the wound and placing its end under antiseptic contained in a bottle under the bed. The wound is covered by dressings which may be left *in situ* for some days. The simple covering of the short drainage tube with copious dressings also fairly effectively prevents entrance of air, but they would probably need frequent changing if there was much discharge. For all-round efficiency and comfort to the patient the running of the discharge into a bottle is probably the better method. Irrigation is optional.

Operation.—At operation the patient is placed in the prone position, with the affected side somewhat uppermost. Now, with the arm by the side, the angle of the scapula is palpated. The rib just below the angle, which is usually the eighth, is the one to resect. If a lower rib is selected, then there is a definite risk of encountering the diaphragm or of performing a transthoracic laparotomy. The resection may be carried out in the posterior axillary line or in the scapular line. The rib having been decided upon, the arm on the affected side is abducted to a right angle. The skin over the rib is anaesthetized with a 0.5% or 1% "Novocain" solution for a distance of about four inches. The skin is divided and the varying amount of muscle encountered is then infiltrated and divided. The periosteum is now exposed and this is ballooned up with local anaesthetic. Next, a perineural injection of the intercostal nerve, as it lies beneath the lower edge of the rib, is carried out. Further infiltration is made into the intercostal spaces above and below the rib.

The periosteum is now incised along the centre of the rib and the rib is stripped free. The bone is exposed for about five centimetres (two inches) and the rib is divided flush with the periosteum, no uncovered bone being left behind. This minimizes the likelihood of osteomyelitis developing.

The posterior layer of periosteum and the pleura are now infiltrated; a small incision is made in this layer and the opening is completed by sinus forceps. The pleural cavity is explored with the finger, but no attempt is made to break down adhesions extensively. The removal of pus and of masses of purulent fibrin may be facilitated by the use of a sucker and a sponge-holding forceps. A short tube with many side openings is inserted and is held in position by a stitch. The insertion of a safety pin through the tube is also a wise precaution. The final details have already been discussed.

After-Care.—No matter what form of drainage is used, the details of the after-care are the same. As soon as the temperature has been normal for a few days the patient is encouraged to sit up and do blowing exercises. If pulse and temperature remain satisfactory, many of the less seriously affected patients can be got onto their feet in the second week. This is a great stimulus to lung expansion, and is a means of greatly shortening the convalescence. A high caloric diet is an important detail, and the majority of these patients do very much better if nursed out on the balconies.

Lung Abscess.

If pus has been obtained by an aspirating needle and no pus is found in the pleural cavity, then you may be dealing with a lung abscess. The finger may locate this and its presence confirmed by needling. With the needle still in position the abscess is marsupialized; this is usually more effectively carried out by resecting another rib and suturing the skin, intercostal muscles and pleura to the lung surrounding the periphery of the abscess. It is wise to defer opening the abscess for at least two or three days, to ensure the formation of firm adhesions.

Conclusions.

In conclusion, let us summarize the treatment of empyema:

1. Empyema rarely, if ever, demands immediate operation by thoracotomy.
2. In practically every instance aspiration should be an introductory treatment. Symptoms are relieved, the effusion becomes localized and subsequent operation is rendered safer. Aspiration alone is rarely successful. However, in recent years successes have been claimed for aspiration followed by injection of such antiseptics as "Optochin", bile salts and, quite recently, "Prontosil" soluble.
3. Thoracotomy should be reserved for cases which are obviously localized in their distribution, and the operation should be performed in such a

way as to reduce to a minimum the occurrence of pneumothorax.

4. In the majority of cases convalescence need not be as protracted as has been the custom in the past. I should be inclined to discard Dr. Sleeman's bowl of goldfish and to present to the patient one of the wind instruments, the playing of which would stimulate him to be up and doing. I am definitely in favour of the bagpipes.

THE MEDICAL TREATMENT OF UNCOMPLICATED PEPTIC ULCER.¹

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PEPTIC ULCER AS A MEDICAL AILMENT.

The modern trend of medical opinion is that uncomplicated gastro-duodenal ulcer is essentially a medical ailment and that the treatment of many of its complications is essentially surgical. In coming to this conclusion certain aspects must be considered:

1. The great majority of peptic ulcers have a tendency to heal quickly, within six to eight weeks, and break down even more quickly. If the main aetiological factors of ulcer are not appreciated and dealt with, recurrence is very likely. Probably 80% to 85% of all ulcers are of this type.

2. To promote healing is not a very difficult matter, and this applies with rather more force to a duodenal than a gastric ulcer. Our main troubles lie in preventing a recurrence with all forms of therapy.

3. Chronic indurated ulcers without any tendency to heal spontaneously form a very small percentage of all gastro-duodenal ulcers. Sippy put this figure down at about 10% of all ulcers. The failure of honest and conscientious medical attempts to cure an ulcer of this type is a definite indication for asking assistance from our surgical colleagues.

4. In a great majority of cases pyloric obstruction is a definite indication for surgical assistance. One must not, however, be absolutely dogmatic even in this matter. In some cases the delay in the passage of food contents through the pylorus may be entirely due to surrounding oedema and inflammation, and not necessarily to cicatricial tissue. Consequently if the symptoms are not urgent or dangerous, patients with this condition should be treated in hospital, the effect of alkalis as well as of treatment generally being carefully watched, and the progress checked by radiological examination. In this connexion, as an adjunct to treatment, aspiration of the stomach contents at night, at least three hours after the last food is taken, is an invaluable measure. I have repeatedly seen cases

in which there were large stomach residues, six hours and even much longer after meals, and in which no radiological signs of pyloric obstruction could be found after a period of strict medical therapy and night aspiration.

WHAT MEDICAL THERAPY MEANS.

Our ideas must be concrete as to what is meant by medical therapy. To be adequate, it means that the patient in the first place must go to bed for a certain time, must be given some recognized diet containing milk, given certain remedies, and must particularly be treated by certain measures, such as the removal of any septic foci. In addition, alcohol and tobacco must be prohibited, and as far as possible all sources of worry and anxiety must be excluded. A proper system of medical treatment should always be instituted in all uncomplicated cases at least, and very often in certain complicated cases before any surgical procedure is justifiable, not only when there has been no previous treatment, but also when previous treatment has not been properly carried out according to the above principles.

AMBULATORY TREATMENT.

Personally I will not countenance any form of ambulatory treatment, and think that it is only a makeshift at its best. I consider preliminary rest in bed for some weeks as one of the vital essentials in treatment for all peptic ulcers, and I am of the firm opinion that this, combined with strict medical therapy, will give better and more lasting results with less tendency to relapse. The evidence produced of the success of ambulatory treatment is to me far from conclusive.

In making these statements we must not fail to recognize the invaluable aid that surgery can give us in the treatment of gastro-duodenal ulcer, especially in certain complicated cases. The physician or surgeon who fully appreciates where medicine ends and surgery begins, and *vice versa*, will, by his knowledge and unbiased judgement, obtain the best results for the patient. Close cooperation and consultation between physician and surgeon are often necessary.

TYPES SUITABLE FOR MEDICAL TREATMENT.

Certain types of ulcer are particularly suitable for conservative treatment. These include: (i) ulcers the diagnosis of which has been made for the first time; (ii) ulcers in young people whose general health is good; (iii) all acute ulcers with a short history, and the polycyclic type of ulcer, which has periodic remissions.

In the past, medical treatment of ulcer was frequently unsuccessful because it was not founded upon an adequate knowledge of its pathogenesis. Moreover, it was not realized that after the ulcer had healed the diathesis remained, so that unless the essential exciting causes were eradicated and the accessory causes removed a recurrence was likely. Great stimulus was given to medical therapy

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by the brilliant work of B. W. Sippy, of Chicago. The Sippy management is the most systematic plan of ulcer therapy ever devised. It is based on the soundest scientific and physiological principles. The full credit of being the first man to apply logically the principles of rest and neutralization, as well as to recognize the importance of milk as the basis of diet in the treatment of peptic ulcer, undoubtedly belongs to Sippy.

PRINCIPLES OF TREATMENT.

The principles of treatment comprise a consideration of: (i) sepsis and the infective factor; (ii) the acid factor and the presence of free hydrochloric acid in the stomach; and (iii) accessory factors.

The Infective Factor.

Most modern authorities are agreed on the importance of infection as an exciting, possibly an essential cause of gastro-duodenal ulcer, and it is necessary therefore to eradicate completely any infective foci which may be found. Even those who are opposed to the view that sepsis is not an immediate exciting cause of peptic ulceration, admit that once an ulcer has developed the presence of sepsis in the body will often militate against rapid and thorough healing or will cause a breakdown or recurrence of the ulcer even after the latter is healed. First in importance is the condition of the gums and teeth, and in my experience periapical infection of the teeth is of prime importance. All teeth with any apical infection should be extracted, while all dead teeth, unless beyond suspicion, are better out of the mouth. Areas of rarefying osteitis should be looked for, even in edentulous patients, as a residual streptococcal infection may persist for many years after infected teeth have been extracted.

Infection of the gums and peridental tissues must also be dealt with. I have found this to be much less frequently associated with ulcer than periapical infection. In most of these cases there is a very low free acidity, which sooner or later goes on to complete achlorhydria. If, however, a peptic ulcer is present, there is usually a rather high acid curve or some definite hyperchlorhydria or hypersecretion, or both. In my experience functional dyspepsia or atrophic gastritis is more frequently associated with infection of the gums and peridental tissues, with pronounced subacidity, or in long-standing cases almost invariably achlorhydria without any gastro-duodenal ulceration, though occasionally this may be present. The same gastric condition is often seen in association with septic tonsils, infected antra and accessory sinuses of the nose, though such may also be present with either gastric or duodenal ulceration, and should be removed.

In my opinion next in importance to, perhaps even more important than, periapical infection of teeth is a diseased appendix. We have all seen many cases in which ulcer has recurred in spite of the strictest treatment, and in which healing has occurred after appendectomy.

For obvious reasons any other foci of infection should be removed, the most conspicuous of the remainder being an infected gall-bladder, though the association of peptic ulcer with gall-bladder disease is not very common. Finally, gastro-duodenal ulcer may recur or even be initiated by some such infection as tonsillitis, influenza, sinusitis *et cetera*.

The Acid Factor.

I think most medical practitioners will agree that the presence of free hydrochloric acid in the stomach is an essential factor in the formation, and particularly in the development, of an ulcer, and it is at least one of the important factors that may retard healing. The presence of hydrochloric acid, but not necessarily an excess of acid, is essential for the formation of a peptic ulcer. If the ulcer is situated at some distance from the pylorus and the latter is not unduly irritable, there need not be hyperchlorhydria, and there may be a normal or even a low acid curve after a fractional test meal. Some writers have reported the association of ulcer with achlorhydria. In my own practice I have seen three cases in which peptic gastric ulcer was reported radiologically and in which there was absence of free hydrochloric acid. In each of these the blood reacted to the Wassermann test and healing occurred on the administration of potassium iodide. Hurst points out the interesting fact that a peptic ulcer has never been reported in pernicious (Addisonian) anemia.

In most instances a peptic ulcer is situated near the pylorus and acts as an irritant causing pyloric spasm, and so may delay emptying of the stomach. Even more important is the fact that the spasm prevents regurgitation of the alkaline duodenal contents. This leads to hyperacidity, which in turn acts as an irritant, and so a vicious cycle is formed.

Accessory Factors.

Tobacco.

Tobacco is an important factor in the pathogenesis of ulcer, probably largely on account of the increased gastric secretion to which it gives rise. No patient should be allowed to smoke during the period of strict treatment nor until the ulcer is completely healed. In my own cases I insist that smoking should not be indulged in for at least six and preferably twelve months, or very often longer, particularly if the patient has a definite ulcer diathesis; such patients I should prefer to relinquish the habit altogether. In all cases I advocate that smoking must always be very moderate, even if the patient is allowed to resume after the ulcer has completely healed.

Nervous Factors.

Anxiety, worry, mental stress and strain and various nervous influences are all important accessory factors in the pathogenesis of ulcer. In this connexion the anxiety factor must be fully stressed. These patients, to get the best results, must first

have complete mental rest. Secondly, nothing will assist a breakdown after the ulcer has healed more than an anxious or worried state. It is our duty as far as possible to obviate these influences. The idea that peptic ulcer is a local manifestation of nervous disturbance in susceptible individuals is not new. The frequency of nervous factors in recurrence and in initiating symptoms is evidence of the importance of these nervous influences. For efficient treatment, therefore, the patient's whole environment must be considered.

Having realized the importance of the preceding principles and the necessity of adequately attending to them in detail, we are now in a position to discuss the other necessary medical measures.

Medical Measures.

Medical measures are: (i) rest, (ii) diet and control of foods, (iii) the administration of alkalis and other drugs, (iv) aspiration of the stomach contents, (v) permanent after-treatment, and (vi) various other forms of treatment, including especially the histidine treatment.

Rest.

Rest is of the first importance as preliminary treatment if medical treatment is to give permanent results, preferably rest in a suitable hospital with adequate facilities. The precise time to be spent in bed at the beginning of treatment must vary to some extent with the condition of the patient and the rate of healing, as shown by radiological examination or the examination of the faeces for occult blood. I generally keep my patients in bed for two and occasionally three weeks, but allow them to use the toilet if there is no complication. At the end of this period I allow them to have a daily bath and sit up on a lounge, but do not permit them to walk about much. The patient carries on in this way for another week or occasionally two weeks, either in hospital or at home. Actual work should not be resumed for at least two and preferably four weeks after leaving hospital, if this can possibly be arranged.

Diet.

The general principles of diet in the initial stages are to give at regular frequent intervals small quantities of a food which is nourishing and non-irritating, will pass out of the stomach without undue delay, and will combine with, and so get rid of, as much acid as possible, or inhibit its secretion.

Secondly, all foods which lead to the secretion of a large quantity of gastric juice must be avoided. The food which fulfils all the primary conditions most satisfactory is milk, and consequently is the basis of all diets in the treatment of peptic ulcer. Plain milk may be improved by the addition of citrate to prevent the formation of a tough clot in the stomach, and if some cream is added this will not only increase the nutritive and calorific value, but tend to inhibit secretion of the gastric juice owing to its high fat content. Milk neutralizes

approximately its own volume of 0.3% hydrochloric acid. If therefore 1,500 cubic centimetres (2½ pints approximately) of milk, or milk and cream, could be administered in such a way as to coincide with the varying rates and periods of acid secretion, the milk would be by itself sufficient to keep the gastric contents neutral throughout the day, provided not more than 1,500 cubic centimetres of 0.3% hydrochloric acid were secreted.

The administration of milk every hour leads to complete achlorhydria for a considerable part of the day; but free acid appears from time to time before the next feed is due, especially in the afternoon and evening. The addition of alkalis between feedings is to overcome this difficulty, while to obtain complete continuous neutralization, aspiration is often required, particularly in the evening and late at night, to minimize the amount of free hydrochloric acid in the stomach during the night.

Milk should be given in small quantities, at frequent intervals—either 90 cubic centimetres (three ounces) every hour or 150 cubic centimetres (five ounces) every two hours, from 8 a.m. to 8 p.m. Milk may be given alone; but cream may be added in equal or smaller proportions according to the tolerance of the patient, to make up the same quantity. If the cream tends to nauseate, it may be lessened or omitted.

Alkalis.

I have no hesitation in saying that alkalis are necessary and should be given, if no contraindication exists; but the secret of successful alkali treatment is that it must be as intensive as possible.

I find by experience that combinations of alkalis are best. I choose from sodium bicarbonate, magnesium carbonate, magnesium oxide, calcium carbonate and bismuth oxycarbonate, and sodium citrate (to be added to the milk). Tribasic calcium and magnesium phosphates are most useful as substitutes to be given to old people with deficient kidneys or when renal disease makes it dangerous to use the ordinary alkalis. In such cases, for long continued use, the mixture of the tertiary (tribasic) phosphates, in doses of 3.6 grammes (one drachm), is probably the best, as they are not excreted in the urine and do not irritate the kidneys.

Recently synthetic magnesium trisilicate has been used by Mutch at Guy's Hospital, London, the preparation used being "Magsorbent". This is said to have excellent adsorbent and antacid properties. It is given midway between feedings at intervals of two hours, and later three hours. One half-hour before each feeding 7.5 cubic centimetres (a quarter of an ounce) of paraffin emulsion in colloidal kaolin is given to avoid attrition at the ulcer site and impedance at the pylorus. Mutch concludes that as an adsorbent this product excels all other preparations, and has in addition marked antacid value. He states that it can be given in large doses safely without upsetting the general motility of the digestive tract, because it is completely insoluble in water, and any excess is voided in the stools.

It might not be out of place here to refer to alkalosis. Symptoms of alkalosis, which are really due to the depletion of chlorine from the body, usually supervene in the first two weeks or so of treatment, if they are going to occur, and seem to be less likely to occur in gastric than in duodenal ulcers. I think the danger of alkalosis, though a real one, is very slight and with ordinary care and intelligent treatment may be disregarded, except when there is chronic nephritis or pyloric stenosis with much vomiting. During an experience of fifteen years with many hundreds of cases I have never seen severe alkalosis, although my alkali treatment is always intense. I have seen mild symptoms, such as headache, anorexia, nausea, depression and aching muscles *et cetera*, which have disappeared at once after the withdrawal of the alkalis for a few days.

The danger of alkalosis can probably be reduced by the addition of more salt to the diet; it is therefore, not wise to restrict too greatly the intake of salt.

Other Drugs in the Treatment of Peptic Ulcer.

Olive Oil.—Olive oil, for those who can take it, is a valuable adjunct to treatment, as it not only assists by diminishing gastric secretion to some extent, but has a nutritive as well as possibly a slight aperient value.

Atropine and Belladonna.—Atropine and belladonna are invaluable drugs, which may be given in various ways, the former subcutaneously or by mouth. My own practice is to give 0.6 cubic centimetre (ten minims) of tincture of belladonna in a large tumbler of water, one hour before the first food in the morning, and at bedtime, for the first three months.

Bismuth Salts.—Bismuth salts are useful. I prefer bismuth subnitrate, which I find useful mainly on account of its sedative and astringent action, possibly from the nascent nitrogen evolved. I think it is best given in one large dose daily; I prescribe a dose of 8.0 cubic centimetres (two drachms) half an hour before the first food in the morning.

Aspiration.

Sippy directs that the gastric contents should be withdrawn as a routine. In my opinion, aspiration is not necessary as a routine, if the diet is properly regulated and a sufficient quantity of alkali and belladonna or atropine is being given. The main objects of aspiration are: (i) to make quite certain we are giving sufficient alkali to neutralize the free hydrochloric acid, and (ii) to draw off any free hydrochloric acid at night, if this is not all being neutralized.

There is, however, one condition in which I think aspiration is clearly indicated. In some cases, particularly of duodenal ulceration near the pyloric ring, or prepyloric ulceration, there may be slight pyloric obstruction, which is often due solely or in part to an accompanying inflammatory reaction rather than to scarring. In such cases aspiration

between 10 p.m. and 11 p.m., and occasionally in the late afternoon as well, is essential. It must be carried on for the whole period of three or four weeks while the patient is in bed.

Permanent After-Treatment.

Investigations of the ulcer diathesis show that the tendency of recurrence after medical treatment and the equal tendency to the development of new ulcers are primarily the result of constitutional peculiarities of the individual, combined with some undiscovered focus of infection, or some accessory factor or neglect in proper therapy.

Lack of care is one of the commonest causes of ultimate failure of medical treatment. Fairly strict rules must be adhered to for years, or perhaps for the remainder of the patient's life. Such rules are mainly concerned with dieting.

The first principle is to avoid all foods which excite a free flow of gastric juice, and these include meat soups and beef teas, meat extracts, condiments, pickles, curries, all highly seasoned dishes, salt in excess, vinegar, raw acid fruits, and so on.

The second principle is to avoid foods likely to leave a residue which may cause mechanical irritation to the mucous membrane of the stomach. This covers the less easily digestible types of meat, and especially beef, twice-cooked meat, new bread and pastry, raw vegetables and greens, nuts, unripe fruits, all pips and skins.

The third principle is to eat slowly, masticate food properly, and especially to take meals of a moderate size only. I am satisfied that large meals conduce to recurrence of an ulcer and increase the risk of perforation when a deep penetrating ulcer is present.

Meals should be regular and punctual and no business or social affairs should be allowed to interfere with this.

Again, everything which does not lose its chemically irritating properties by dilution with saliva must be prohibited, and this prohibition includes all forms of alcohol, strong coffee and strong tea. Tea may be taken in moderate amounts, especially if well diluted with milk, when healing is complete.

It is best to eliminate alcohol entirely; but if the patient will not adhere to this counsel of perfection, then the lighter wines may be allowed, but spirits only if well diluted. Concentrated alcohol, especially liqueurs and cocktails, must not be allowed.

If there is a definite tendency to acidity and hyperchlorhydria, in which case the stomach empties rapidly and undiluted gastric juice may be present at some time before the next meal, it is essential that a drink of milk or milk and cream, either alone or with a biscuit or some soft bread and butter, should be taken once or even twice between meals and at bed time, and even during the night if required.

Other Forms of Treatment.

Other forms of treatment are the use of the Einhorn duodenal tube; injections of a foreign pro-

tein or lipoproteins with or without emetine, such as "Synodal" and "Parulcine"; mucin by mouth; vaccine therapy; and finally injections of histidine. I have had no experience of any of these except histidine, so I do not intend to discuss them.

Histidine Therapy.—I have used histidine in about sixty cases, and I cannot satisfy myself that the extravagant claims made for it are warranted. In my experience it has been quite harmless.

I have gained the impression that patients having histidine injections feel better in themselves and do not look as anæmic as some few patients taking milk and alkalis alone. Moreover, I think that very often histidine hastens healing. In one case of duodenal ulcer in which I combined medical therapy and histidine administration, no radiological evidence of the ulcer could be found after three weeks, and I have seen several cases in which all signs of an ulcer crater had disappeared in four to six weeks. In all but a few cases I have combined histidine therapy with usual hospital and strict medical treatment, and in all cases I have used alkalis, bismuth subnitrate and belladonna.

The majority of my patients on the whole have not done any better since I combined histidine with my usual treatment.

My own view is that probably the use of histidine is an advance in ulcer therapy and is of possible assistance in some cases, but one is not justified in using it as a substitute for rest, diet and the usual measures carried out in a strict medical management.

THE TREATMENT OF PEPTIC ULCER.¹

By SIR HUGH DEVINE,

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DURING the last few years considerable advances have been made in our knowledge of the causation of peptic ulcer; and this more precise knowledge has clarified the principles on which the medical and surgical treatment of peptic ulcer should be based.

There are various schools of thought in regard to the treatment of peptic ulceration: that it should be almost entirely medical; that it should be almost wholly surgical; that certain types of cases should be selected for medical and certain for surgical treatment. As far as surgical treatment is concerned, there are those surgeons who rely on the simpler surgical measures, such as gastro-enterostomy, and those who believe that only radical measures, such as partial gastrectomy—measures which profoundly reduce the acidity—are efficacious.

The same variation is found in regard to the treatment of bleeding from peptic ulceration. Up to the present, bleeding peptic ulcer has been almost entirely treated by the physician; but there is a growing belief that bleeding from the chronic peptic

ulcer should be treated by the surgeon. Statistics do not help us; for it seems that they can be used to prove any contention in problems relating to peptic ulcer. In recent years, however, surgeons have become more conservative, and more physiological in their outlook; and they demand very definite indications before they operate for peptic ulcer. On the other hand, I am inclined to think that physicians have become too conservative; they have not discriminated between those cases of peptic ulcer which are curable by medical treatment and those which are incurable; they have not availed themselves of the good results which modern surgical treatment can give in carefully selected cases of peptic ulcer.

THE CAUSES OF PEPTIC ULCER IN SO FAR AS THEY DETERMINE TREATMENT.

The Role of Peptic Action in the Formation of Ulcer.

Peptic ulcer is found in those regions where peptic action takes place. It is found on the gastric canal (*Magenstrasse*), in the first part of the duodenum and in the first part of the jejunal efferent loop in a gastro-enterostomy. Peptic ulcers are never seen in fundal mucous membrane, where the peptic juice originates, and rarely in the other parts of the stomach. Peptic ulcer is also occasionally found in a Meckel's diverticulum which contains dystopic gastric mucous membrane secreting acid. In such cases the ulcer forms at the neck of the diverticulum, and it never occurs in the mucous membrane which produces the acid.

In relation to these peptic influences, questions will naturally arise: Is peptic ulcer caused solely or only partly by peptic influence? If it is caused wholly by peptic influence, why does it occur in some persons and not in others? Why does it develop in certain spots in the areas in which peptic influence is exerted? If we knew the answers to these questions, we might be able to postulate some basis for the causation of peptic ulcer, and therefore have some clinical basis for its treatment.

Possible factors in the areas concerned with digestion—factors which may vary and which, therefore, may play a part in the formation of peptic ulcer—are: (i) pathological alterations in the peptic juice, (ii) pathological alterations in the secretory phase of the peptic juice, (iii) pathological alterations in the vitality of the gastric or duodenal wall, (iv) the presence of a chronic gastritis.

Pathological Alterations in the Peptic Juice.

The digestive power (and perhaps the ulcer-forming power) of the peptic juice depends on the concentration of hydrochloric acid—the higher the concentration, the higher the digestive power. Dragstedt has shown that frogs' legs begin to be digested only when the concentration of hydrochloric acid reaches a percentage higher than normal.

Aschoff ascribes the ulcer-forming power of gastric juice not so much to a digestive action as to a corrosive action of its acidity. He shows, as the first stage of chronic ulcer, sections of fibrinoid necrosis caused by the erosive action of the acid.

¹Read at the fifth session of the Australasian Medical Congress (British Medical Association), August, 1937.

Dragstedt has made an important experimental contribution to the discovery of the cause of ulcer and, incidentally, to its treatment. He sutured one kidney into the Pavlov pouch made in the fundus of the stomach in such a way that it was subjected to the influences of pure undiluted gastric juice, and one into the stomach, where it was subjected to the influences of the gastric juice in combination with the intake of food and fluid into the stomach. The kidney in the pouch became eroded and ulcers formed on it, but the one in the stomach remained uneroded for months. Thus he was able to show that pure undiluted peptic juice would erode the normal gastric wall, and that, in normal circumstances, it was the dilution of the peptic juice with gastric and duodenal secretion and with the intaken fluid and food, which buffered the peptic juice and protected the gastric or duodenal wall from an injurious digestive or corrosive action. Hence we may assume as a result of experiment that pure normal undiluted gastric juice can injure the gastric wall and cause ulcer—an important observation from the point of view of treatment.

I have myself seen ulcers which Mann, of the Mayo Research Institute, had experimentally produced in three weeks by turning the whole of the acid contents of the stomach into the ileum. I could not detect any difference between these ulcers and chronic ulcer of the duodenum.

We see, too, clinically the effect of peptic juice on the normal mucous membrane of the jejunum. When the whole of the acid gastric contents are turned onto the healthy jejunal wall by a gastro-enterostomy combined with a pyloric occlusion, peptic ulcer will develop in up to 30% of cases; that is, develop solely as the result of the peptic action, for the jejunal wall is healthy. And, furthermore, it always develops in the same spot; that is, where the acid contents are projected on to the jejunal wall.

Again, recent work by Puhl and Schmidt shows that perforation of a peptic ulcer is due to an exacerbation of peptic action. In microscopic preparations made from specimens of resected perforated ulcers which have been immediately fixed in formalin, it is possible to see the actual perforating point as a fibrinoid necrosis, the result of peptic action, and an area of inflammatory infiltration, which is secondary to this fibrinoid necrosis.

Thus we have ample evidence that peptic ulceration can be caused solely by the action of excessive acidity, and it is on this conception that the radical treatment of chronic peptic ulcer by the Continental surgeon is based. But is peptic action the only factor in every case of peptic ulceration?

Pathological Alterations in the Gastric or Duodenal Wall.

Aschoff and the Continental schools are emphatic that a disturbance of the vitality of the gastro-duodenal wall is not a necessary precedent for the formation of ulcer. They say that they cannot find certain pathological anatomical conditions in the

gastric or duodenal wall, which must be present if there are precedent circulatory or other changes. Dragstedt, however, has shown that a normal circulation in the gastric wall protects it against the injurious effect of gastric juice. A kidney with a normal circulation sutured in continuity with the gastric wall was not digested, and therefore he thinks that protection against the action of acid gastric juice is not confined to the stomach.

In a *post mortem* specimen of a duodenum¹ found in a patient who suffered from cystitis, pyelitis and other infections, primary devitalizing inflammatory tissue changes can be seen in the duodenal wall, and two small, clean-cut acute ulcers are present in the middle of a patch of duodenitis. These ulcers must have arisen as a result of a primary devitalization of the duodenal wall; and probably in this case the acidity of the peptic juice was normal. We have all seen hæmatemesis and melena arise from acute ulcers of this kind, which have formed during the course of some infection, such as an acute appendicitis. And we have seen some of these ulcers ultimately become chronic ulcers.

The English school is more inclined to believe that chronic peptic ulcer arises from these acute ulcers in this way, and that a deficient vitality is a necessary precedent factor in its formation. Its adherents think that chronic ulcer arises out of these acute ulcers as the result of the irritative action of food, of acidity, of peristaltic movement, and perhaps of the effect of a secondary coccal infection—all of which factors prevent the acute ulcer from healing.

In this conception, then, we have the attitude of the English school, in contrast to the attitude of the Continental school, towards the treatment of peptic ulcer. Its attitude is one of conservatism—either medical treatment or the more conservative form of surgical treatment, gastro-enterostomy. It does not believe in the radical gastric resections which profoundly reduce the gastric acidity—treatment based on the conception that ulcer is entirely due to gastric acidity.

A Precedent Chronic Gastritis.

Of recent years a new conception in regard to the origin of peptic ulcer has been brought forward by Konjetzny and other Continental workers; and it is one that, if accepted, would profoundly alter our principles of treatment. His conception is based on observations made from the examination of a great number of specimens from gastric resections for peptic ulcer.

These observers think that ulcer arises on the basis of a chronic gastritis, and that peptic ulcer is merely a symptom of the late stage of such a condition. Konjetzny believes that this gastritis is caused by some exogenous toxic factor; but other writers think it may be due to some vitamin deficiency. This form of chronic gastritis is charac-

¹ Sir Hugh Devine showed a lantern slide illustrating this condition.

teristically limited to the gastric antrum, to the duodenum and to the jejunum and the vicinity of the stoma in the case of a gastro-enterostomy. Aschoff describes a similar form of gastritis; but he regards it as being caused by the action of excessive acidity, and believes it to be a pre-peptic ulcer condition. However, from limited investigations which I have made in this country, I can find very little evidence of an association of a primary gastritis with peptic ulceration.

The Causes of Peptic Ulcer Considered Together.

We have now the following facts in regard to the causation of peptic ulcer:

1. That it arises solely from peptic action, either (a) from a high acid concentration, (b) by the action of the normal peptic juice in an undiluted condition, (c) by the concentration of the effect of peptic juice by muscular action.
2. That there may be a precedent chronic gastritis of doubtful origin, caused by either (a) acidity (Aschoff), (b) some vitamin deficiency or toxic factor (Konjetzny).
3. That there may be a disturbance of the vitality of the gastric wall, caused by (a) circulatory infective and toxic disturbances, (b) metabolic disturbances.

When, too, we are considering the causation of peptic ulcer in relation to its treatment, we must also add to these primary causes those secondary changes in the tissues due to chronic ulceration which maintain the ulceration, that is, which prevent an ulcer from healing once it is well established. These secondary changes comprise: (i) the mass formation of fibrous tissue—scar formation, (ii) the complete penetration of the gastric wall, (iii) the onset of pyloric or hour-glass obstruction.

Scar fibrous tissue has very little resistance to peptic action. An ulcer which has penetrated the gastric wall has deprived a hollow organ of certain natural healing facilities with which it is endowed and by means of which a wound in it is enabled to heal. Pyloric stenosis mechanically cripples a stomach.

If now we look at the table of primary causes with clinical eyes, two things at once strike us. The first is that it is only necessary to postulate two causes of peptic ulcer—pathological alterations in peptic action and devitalizing changes in the gastric wall—for the gastritis of Konjetzny, judged from our own clinical experience, is more likely to be caused by peptic influences rather than by some hypothetical toxic influences. The second is that, from the viewpoint of a clinical observation, we are justified in saying that in some extreme cases peptic influences may be the sole cause of ulcer; and that in others a deficient resistance in the gastric or duodenal wall may be the main factor in the origin of ulcer, but that in a majority of cases of chronic peptic ulcer both these conditions are varying causative factors, the combination producing a certain type of ulcer, much in the same

way as a varying combination of the virility of an infective organism and the tissue resistance of the body may produce a certain type of infection.

Such a clinical conception of the aetiology of peptic ulcer, I feel, may provide the practising medical man with a working hypothesis in regard to its treatment. Anyway, this is a conception which has afforded me some explanation of why some ulcers of the stomach or of the duodenum are more like an old chronic ulcer of the leg, and do well with medical treatment or with a gastro-enterostomy, while other ulcers, which look much the same, cannot be cured by medical treatment or even by gastro-enterostomy, but require a partial gastrectomy.

THE QUESTION OF MEDICAL OR SURGICAL TREATMENT.

In regard to medical treatment of chronic peptic ulcer, there is always one most important preliminary consideration; and that is to be sure that the condition that is about to be medically treated is really an innocent peptic ulcer and not a malignant growth. Of recent years, since medical treatment of peptic ulcer has become "fashionable", I have seen a number of patients with gastric cancer treated as gastric ulcer, until the lapse of time showed the true nature of the condition. Certain forms of gastric cancer can give a painful dyspepsia clinically indistinguishable from that of gastric or duodenal ulcer. In some of these cases even an expert radiographer may not demonstrate the "filling defect" of the carcinoma; for these malignant conditions are often of a plaque-like type, which gives rise to a sharp-edged deformity exactly like that of the spasm sometimes caused by a chronic ulcer.

In acute, subacute, gastric and duodenal ulcer the treatment will always be medical, even when these ulcers bleed.

In the chronic gastric or duodenal ulcer, when there is no definite diathesis and when secondary changes have not taken place, medical treatment gives every prospect of permanent cure. Here the ulcer has perhaps originated as a result of a transitory affection of the gastro-duodenal wall, and the ulcer has been maintained by the action of acidity, gastric function, food and secondary infection—all medically removable causes.

When a gastric or duodenal ulcer is associated with a definite, perhaps causative, diathesis, although temporary cures may be obtained with medical treatment, it cannot be expected to give a permanent cure, for it cannot permanently modify the inherent causative factors. For instance, the duodenal ulcer associated with a high acidity and a very quick emptying time will keep recurring after being "medically cured", because the muscular stomach and the high acidity are the causative factors and cannot be permanently removed by medical treatment.

When secondary changes have taken place in a gastric ulcer there is much danger in continued medical treatment: there is the danger of death

from an intercurrent affection the result of ill-health caused by the effects of the ulcer; there is the danger of bleeding, of perforation and of malignant degeneration. There is, too, very little chance of such an ulcer healing naturally, especially if it is complicated by a stenosed and, therefore, crippled stomach. On the other hand, it is in this type of ulcer that surgical treatment offers a permanent cure—removal of the ulcer and its causes—and a low mortality rate (5%).

Although in the case of duodenal ulcer, associated with a diathesis or with secondary changes, medical treatment does not offer much prospect of permanent cure, still surgical treatment does not give such good results as in gastric ulcer in the same circumstances. Simple operations like gastro-enterostomy are not very effective, and generally give rise to jejunal ulcer; severe operations like partial gastrectomy and duodenectomy, though attended with permanent cure, are formidable, have a high mortality rate and occasionally have unpleasant by-effects. It is for reasons such as these that while medical treatment is perhaps not justified in the gastric ulcer with secondary changes, it may be in a duodenal ulcer with similar changes, and especially since, in duodenal ulcer, there is no danger of malignant degeneration.

Thus the question of medical treatment of peptic ulcer depends upon (a) the factors in its causation, the type and the situation of the ulcer; (b) its response to treatment; (c) the presence of secondary conditions.

When, too, the question of medical treatment arises, Konjetzny's theory that ulcer arises on the basis of a chronic gastritis must not be forgotten; for in this case neither medical treatment nor the simpler form of surgical treatment—gastro-enterostomy—will apply, and a partial gastrectomy will be necessary.

However, a time may arrive when even with the best of physicians the peptic ulcer will not respond to medical treatment; when, for economical reasons, the patient can no longer continue with medical treatment; when, as a result of secondary changes, nutritional disturbances begin to take place and the fear of cancerous degeneration arises—and then the question of surgical treatment will arise.

Surgical Treatment.

Indications for surgical treatment, as I have pointed out, should be definite. To begin with, the ulcer should be clearly demonstrable on X ray examination, and it should have been refractory to faithful medical treatment. Definite indications for surgical treatment would be the association of a bad duodenal ulcer with a diathesis such as high acidity and quick emptying; the complication of a very chronic, well-established gastric or duodenal ulcer with profound bleeding; or great chronicity of peptic ulcer associated with secondary changes, in which considerable destruction of tissue, scar formation and stenosis have taken place.

In the surgical treatment of peptic ulcer, two main principles of treatment should, if possible, obtain: first, the primary and secondary causes of the ulcer should be dealt with, and secondly the area of tissue permanently or partially destroyed by ulceration should be resected.

Gastro-Enterostomy as a Treatment for Peptic Ulcer.

When the surgical treatment of peptic ulcer is broached, the first thing that the surgeon (especially the surgeon inexperienced in gastric surgery) thinks of is gastro-enterostomy. He regards it as an easy and a delightful operation to perform, and one that heaps fame on the surgeon. But nothing is further from the truth: it is a difficult operation to carry out properly; it frequently causes extreme misery when performed improperly; it does not cure many forms of peptic ulcer; and it has ruined the reputation of more than one surgeon. I have undone over fifty unsuccessful gastro-enterostomies, but I know of no operation for the beneficial results of which patients are more grateful.

Gastro-enterostomy does, as a rule, cure chronic duodenal ulcer which is not associated with a definite diathesis. It may cure the duodenal ulcer which is associated with a very high acidity, with a quick gastric emptying time; but in a high percentage of cases it will be followed by a more painful and dangerous form of ulcer, that is, by jejunal ulcer (from 5% to 30%).

Gastro-enterostomy should not be employed for a duodenal ulcer in a young person, no matter what the type of ulcer; for it is only a question of the patient's living long enough for a jejunal ulcer to form. The first patient on whom I performed gastro-enterostomy, twenty-three years ago, had a hugely dilated stomach with anacidic contents, the result of a prepyloric healed ulcer; it was a most suitable case for gastro-enterostomy, but the patient came back a year ago with a jejunal ulcer.

Gastro-enterostomy will usually cure a prepyloric ulcer, and because this ulcer is usually not associated with a high acidity there is not a great danger of the subsequent formation of a jejunal ulcer.

The bugbear in regard to gastro-enterostomy is, of course, its tendency to be followed by jejunal ulcer. And it should be remembered that the operation is associated with a much higher percentage of jejunal ulcer than is usually given in literature. It should also be borne in mind that it is not infrequently followed by the most appalling nausea and vomiting.

The therapeutic effect of gastro-enterostomy depends primarily on its power to empty the stomach rapidly—on its drainage effect—and to a less degree on its power to promote regurgitation of duodenal contents. To obtain to the fullest this therapeutic effect for the cure of peptic ulcer the surgeon must know the muscular capacity and peristaltic power of the stomach of the particular patient on whom he is operating, so that he can so place and shape the stoma as to obtain the most effective gastric emptying and at the same time the

most effective regurgitation of the alkaline and diluted duodenal contents. Such a feat is not so easy as it looks.

The Surgical Treatment of Gastric Ulcer.

Of the results of the surgical treatment of peptic ulcer, those of gastric ulcer are by far the best. Partial gastrectomy is the operation of choice. Carried out on modern lines, with local or gas

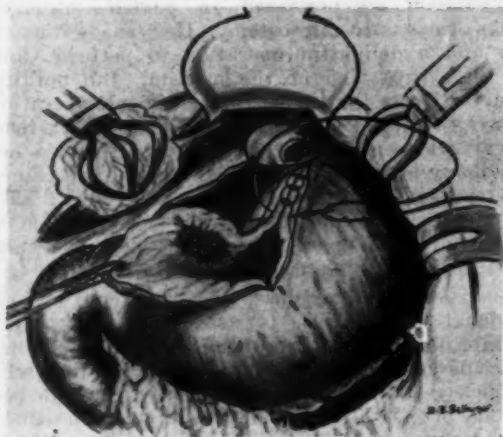


FIGURE I.

Showing a stage in partial gastrectomy for ulcer of the lesser curvature. A prepyloric closure, as in Figure II, A, will be made.

anaesthesia, it gives a high percentage of permanent cures and a mortality rate almost as low as that of gastro-enterostomy. It is an operation peculiarly suitable for chronic gastric ulcer, for it permits of the removal of the causes of the ulcer as well as of the ulcer itself, which, in 5% to 7% of cases, is liable to malignant degeneration.

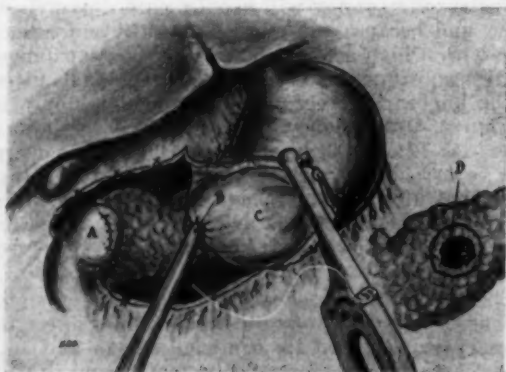


FIGURE II.

Stage in partial gastrectomy for peptic ulcer penetrating the pancreas. A prepyloric closure has been made (A). After the partial resection of the stomach, it will be anastomosed to the jejunum, as shown in Figure III.

In ulcers in certain situations in the stomach partial gastrectomy can be simplified by making a prepyloric closure. Figure I shows a picture of a

partial gastrectomy for an ulcer of the lesser curvature. The jejunum will be anastomosed to the stomach at the dotted line, after the method of Pólya (see Figure III). Figure II shows the partial gastrectomy, with the prepyloric closure (A), for a peptic ulcer which has penetrated the pancreas.

When the prepyloric ulcer has become partially perforated, and has developed into an "ulcer tumour" which is adherent to all the important structures in the neighbourhood, and when, therefore, the prepyloric ulcer is irremovable, a partial

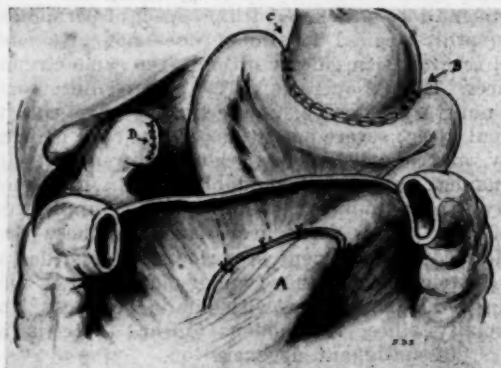


FIGURE III.

Anastomosis of jejunum to stomach after the method of Pólya, and by using a posterior colic jejunal loop as employed by the author and also by Lahey.

gastric exclusion should be carried out. Figures IV and V show where the stomach is divided and how the stomach is anastomosed to the jejunum. The ulcer in this excluded portion will slowly clear up, though it may take months to do so.

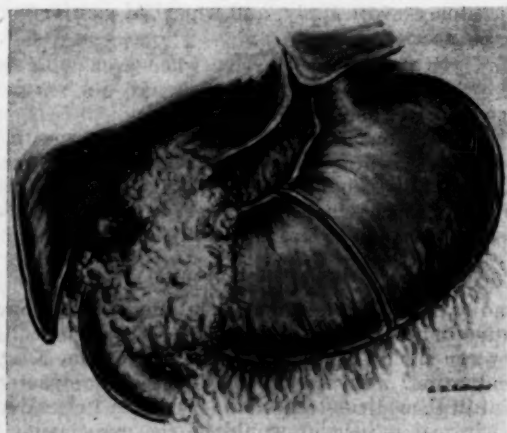


FIGURE IV.

First stage in a partial gastric exclusion for irremovable prepyloric ulcer tumour. The stomach is divided well towards the fundus.

The Surgical Treatment of Duodenal Ulcer.

It is in the surgical treatment of duodenal ulcer that we meet with difficulties.

For purposes of surgical treatment we may postulate two forms of duodenal ulcer: a type of ulcer which we might call an "acidic ulcer"—perhaps caused entirely by high acidity—a particularly chronic and intractable-to-treatment form of ulcer; and a type in which others factors besides acidity play a part in causation and maintenance—a more tractable-to-treatment type of ulcer. In this latter type of ulcer gastro-enterostomy may effect a cure, and as the acidity is not high, it is not likely to give rise to jejunal ulcer. It is questionable, however, whether it would not be just as tractable to skilled medical treatment.

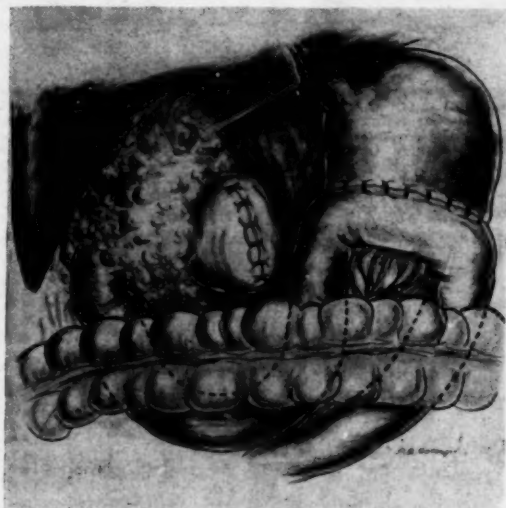


FIGURE V.

Second stage of a partial gastric exclusion for irremovable prepyloric ulcer. The distal cut end of the stomach is closed and the stump of the stomach is anastomosed to the jejunum, after the method illustrated in Figure IV.

In the former type of ulcer gastro-enterostomy may effect a cure, but on account of the high gastric acidity associated with this type of ulcer, it is almost certain to be followed by a jejunal ulcer. It is in this type of ulcer that Finsterer and other Continental surgeons, in order permanently to reduce the gastric acidity, employ partial gastrectomy and duodenectomy. It is, however, a drastic remedy, for the resection of the duodenal ulcer and the subsequent closing of the duodenum are dangerous procedures, and it cannot be recommended as a routine operation. Further, the operation, removing as it does two-thirds of the stomach, is sometimes followed by a secondary anæmia, probably as the result of the loss of the Castle's substance, which is said to reside in the pyloric part of the stomach. In addition to this, recent investigations show that this operation is sometimes followed by a form of chronic gastritis and jejunitis, a condition which gives rise to hæmatemesis and melena, to sickness and vomiting after meals, and to other unpleasant symptoms.

My own surgical treatment for this type of ulcer is to carry out what I call a partial gastric exclusion. Figures VI and VII show the stages of the operation.

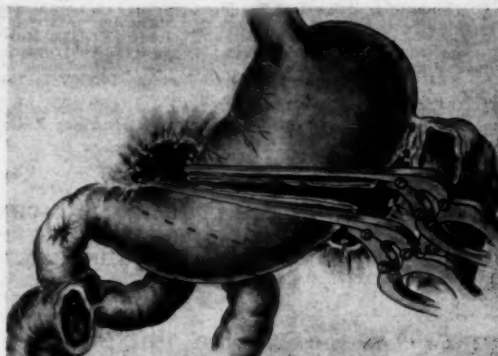


FIGURE VI.

First stage of a partial gastric exclusion. The stomach is divided obliquely at the junction of its proximal third with its distal two-thirds.

In some cases I resect part of the excluded segment. This operation has given excellent permanent results, and its mortality rate is as low as gastro-enterostomy. It is nearly as easy to perform as gastro-enterostomy. It reduces the acidity to the same extent as a partial gastrectomy, provided that the same amount of stomach has been excluded as has been resected. It has these great advantages

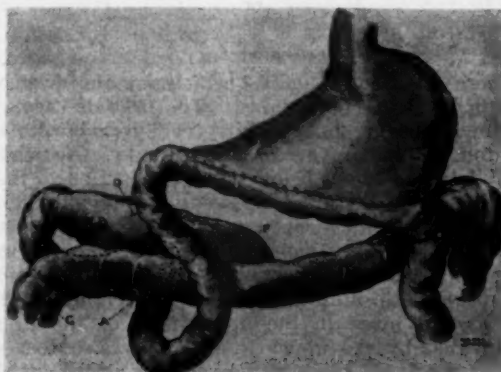


FIGURE VII.

Second stage of partial gastric exclusion. The distal end is closed and the cut end of the gastric stump is anastomosed to the jejunum (in this case in front of the transverse colon). (By courtesy *Surgery, Gynecology and Obstetrics*.)

over partial gastrectomy: that as the pyloric part of the stomach is not removed, it is not followed by any form of secondary anæmia; and that, if gastritis develops, the *status quo* of the stomach can be reestablished.

SUMMARY.

An attempt has been made to lay down principles of treatment based on the causation of peptic ulcer, as deduced from experimental and clinical observations. And some special methods of surgical treatment are illustrated.

BIBLIOGRAPHY.

- Ludwig Aschoff: "Pathologische Anatomie", 1928.
 Lester R. Dragstedt: "Acid Ulcer", *Surgery, Gynecology and Obstetrics*, January, 1936, page 118.
 Lester R. Dragstedt and A. M. Vaughan: "Gastric Ulcer Studies: The Resistance of Various Tissues to Gastric Digestion", *Archives of Surgery*, Volume VIII, 1924, page 791.
 G. E. Konjetsany: "Zur Klinik der Gastritis (Magenblutung und peritonitische Erscheinungen bei der einfachen Gastritis)", *Archiv für Verdauungs-Krankheiten*, Volume XLIII, March, 1928, page 365; "Die entzündliche Grundlage der typischen Geschwürbildung im Magen und Duodenum", *Ergebnisse der inneren Medizin und Kinderheilkunde*, Volume XXXVII, 1930, page 184.
 H. Puhl and R. Schmidt: "Zur Histologie des perforierten Magen-Duodenalgeschwürs", *Zentralblatt für Chirurgie*, Volume LXIII, April 25, 1936, page 993.

STRATEGIC POINTS IN THE LUMBAR AND SACRAL OUTFLOWS OF THE AUTONOMIC NERVOUS SYSTEM: SYMPATHETIC DENERVATION OF THE LOWER LIMBS.¹

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In the first part of this paper I propose to describe certain features of the autonomic nervous system within the abdomen which are of importance to surgeons. The second part deals with sympathetic denervation of the lower limbs.

PART I. Anatomy.

There are certain points which for the surgeon have a strategic importance. The first of these is in the lumbar trunk opposite the upper border of the fourth lumbar vertebra (Figure I). No white rami join the trunk below this point. Hence, if it is divided there, all pre-ganglionic sympathetic fibres passing downwards to make connexion with cells of the lower lumbar and sacral ganglia are severed. The lower limb is effectively cut off from all sympathetic influences of central origin, excepting a small area in the upper part of the thigh innervated by the upper lumbar nerves. Most of the sympathetic visceral nerves leave the lumbar trunk above the point of section, so that they are not damaged.

The sympathetic nerve supply to the distal part of the colon and rectum is shown in Figure I. Pre-ganglionic fibres arise in the spinal cord and pass by way of white rami and lumbar splanchnic nerves to the network in the region of the inferior mesenteric artery (Figures I and II). This network contains numerous ganglia. It corresponds to the collection of ganglia which is found in animals and is called the inferior mesenteric ganglion. Here most of the pre-ganglionic fibres destined to influence the colon end by arborizing about

ganglionic cells. The bundles are collected together in small compass, and may be severed in order to free the colon from central sympathetic influences.

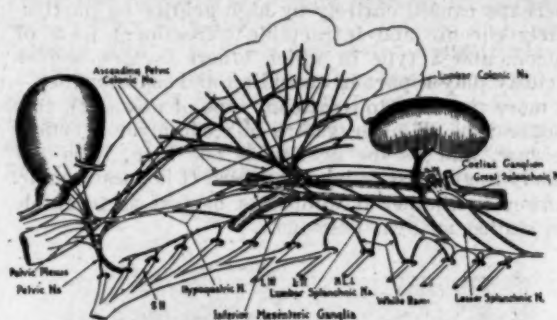


FIGURE I.

Diagrammatic representation of the nerves of the lumbar and sacral outflows of the autonomic nervous system in man. The strategic points referred to in the text are clearly seen in this and the next figure. The pelvic nerve supply to the colon resembles that to the rabbit's colon, as depicted in Figure IV. (Modified from illustrations in papers by the author which have been published in *The British Journal of Surgery*.)

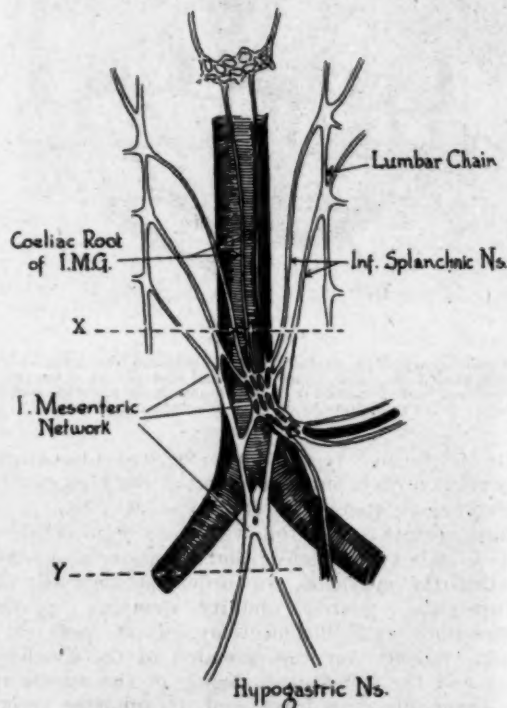


FIGURE II.

Diagram to show the plan of the inferior mesenteric ganglionic network. In the author's operation for sympathetic denervation of the colon the inferior splanchnic nerves and the coeliac root are divided just above their points of junction in the network, along the line X. Loomerth advised resection of the entire inferior mesenteric network between the lines X and Y. (Modified from illustrations in papers by the author which have been published in *The British Journal of Surgery*.)

If the lumbar splanchnic nerves and the coeliac contribution or root are divided a short distance above the ganglionated network, as they converge

¹Read at the fifth session of the Australasian Medical Congress (British Medical Association), August, 1937.

upon it, pre-ganglionic fibres of the sympathetic outflow to the distal colon, rectum and pelvic viscera, excluding the sex glands, are severed (Figure II). The ganglia are left intact and remain in connexion with the various viscera. This is practically the operation which I designed for use in the treatment of megacolon with severe constipation, and first performed in April, 1928.⁽¹⁾ If the branches from the network to the colon and the hypogastric nerves be divided, or the network excised, the viscera will be largely, but not completely, deprived of their post-ganglionic nerve fibres. There are, of course, numerous outlying ganglion cells in the hypogastric nerves and pelvic plexuses. Learmonth⁽²⁾ advocated excision of the inferior mesenteric network in the treatment of constipation.

The hypogastric nerves contain pre-ganglionic fibres passing downwards to make connexion with ganglion cells in the pelvic plexuses, as well as post-ganglionic fibres from the inferior mesenteric ganglia. In their lower parts, at least, they give passage to fibres from the pelvic nerves, ascending to supply the descending colon, as was first pointed out by Telford and Stopford.⁽³⁾ Hence, if the hypogastric nerves are to be divided with the object of decentralizing the pelvic viscera, the section should be made high up, so that the ascending pelvic colonic nerves may be left intact (Figure I).

The observation of Telford and Stopford led me and others to make further investigations.^{(4) (5)} Langley⁽⁶⁾ pointed out long ago that in many animals a few medullated fibres from the pelvic nerve could be traced into the hypogastric nerves. He thought that they returned to the pelvis. It is strange that this observation did not lead, at an earlier date, to the discovery of the ascending pelvic colonic nerves, which are obvious enough. The general plan of the pelvic nerve may be seen in Figures I, III and IV. In dogs and cats the main

which enter the hypogastric nerves; but these are very few in number, and I have not been able to trace them to the upper part of the colon, although it is likely enough that they do reach it. In herbivora (rabbits and guinea-pigs) the colon is long and convoluted. Bundles of medullated fibres from the pelvic nerve pass into the mesentery of the descending colon, some of them by way of the hypogastric nerves, and thus reach that part of the colon supplied with blood by the inferior mesenteric artery (Figure IV). By taking this course the

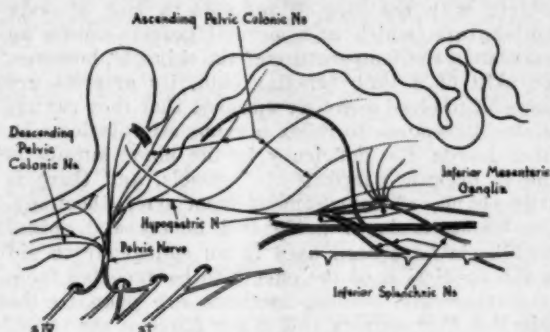


FIGURE IV.

Diagrammatic representation of the pelvic colonic nerves in the rabbit. Some of the ascending bundles pass directly to the gut wall, as in the dog, whilst others run for a time in company with the hypogastric nerves. They take the shortest route across the mesentery to reach the upper parts of the long descending colon.

nerves are much shorter than they would be if they ascended in the wall of the gut, as in carnivora. In man the arrangement resembles that of the herbivora. The description given by Telford and Stopford was inaccurate. Shortly after the appearance of my paper describing the ascending pelvic colonic nerves, Mitchell⁽⁵⁾ published a somewhat similar account of them, and this should be consulted by readers interested in this subject.

PART II.

Sympathetic Denervation of the Lower Limb.

It is now widely realized that many of the disorders of blood circulation, which in their late stages lead to gangrene of the extremities, may be beneficially influenced by some form of sympathectomy. Difficulty has arisen in the selection of patients suitable for operation. The usual operations performed for the interruption of sympathetic fibres to and from the lower limbs are of such a magnitude as to make the surgeon hesitate, because the patients are often old and decrepit and the benefits to be expected from operation are by no means certain to justify a grave procedure involving undeniable risks. I propose to discuss the surgical management of patients in whom the circulation of the lower limbs is so embarrassed that gangrene is likely to ensue. It is to be supposed that conservative measures have been tried out and have failed to control or check the progress of the disease, and that in diabetic patients appropriate medical treatment has been instituted and is being continued.

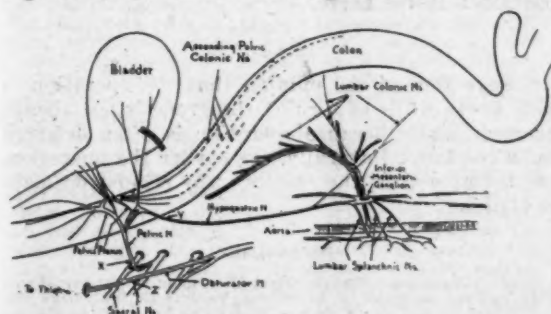


FIGURE III.

Diagrammatic representation of the nerves in the lumbar and sacral outflows of the autonomic nervous system in the dog. The ascending pelvic colonic nerves enter the wall of the colon and ascend in its substance. Possibly some fibres pass up by way of the hypogastric nerves. (Modified from illustrations in papers by the author which have been published in *The British Journal of Surgery*.)

supply to the colon, which is short and not convoluted, is by way of nerves which enter the gut wall low down and ascend in its substance for a considerable distance (Figure III). There are fibres

Selection of Cases.

In an endeavour to ascertain what degree of improvement of the circulation of the skin of the feet might be expected to follow sympathectomy various tests have been devised. In postural tests the rate of emptying and filling of the capillaries of the skin is observed when the foot is raised or lowered. Rapid changes are taken to indicate that the embarrassment of the circulation is due mainly to organic narrowing of the vessels. Brown and Adson advise the intravenous injection of foreign protein with the idea of inducing a rise of body temperature, which in a normal person causes an increase in the temperature of the skin. If, however, the skin of a limb remains cold, its arteries are assumed to be so seriously diseased that they cannot dilate in response to reflex nervous stimulation. In other words, the deficiency in the blood supply is due to organic narrowing of vessels, and there is little chance of improvement from sympathectomy. Local anaesthesia of peripheral nerves and spinal anaesthesia have been used in an endeavour to aid in the prediction of the effects to be expected from sympathectomy. These methods are open to the objection that sensory and motor fibres of the voluntary nervous system are temporarily put out of action, so that the effect cannot be assumed to be due entirely to anaesthesia of the sympathetic fibres. Spinal anaesthesia involves another fallacy, in that a fall in blood pressure is usual. Hence, if there is no rise in temperature of the skin of the lower limbs, it should not be taken as a certain indication that there has been no relaxation of the muscular coats of the arteries and arterioles. Even if this relaxation took place the lower pressure head might easily nullify its effect on the circulation of the extremities.

I have not relied upon any of the above methods in selecting patients for operation. I advise sympathectomy when, in a patient well enough to undergo a comparatively minor operation, the circulation is so poor as to cause severe discomfort, whether intermittent or constant, and gangrene of the toes seems imminent, or is present but still limited to a small area. On the other hand, I do not advise this operation when gangrene is extensive or the patient is for any reason likely to succumb as a result of operation.

My reasons for adopting this attitude are as follows. I have never performed any operation amounting to lumbar sympathectomy without observing subsequently a persistent increase of the temperature of the skin of the leg. Similarly, there has been some degree of relief of pain in all cases in which pain was present. Lastly, the operation to be described is not a tremendous surgical undertaking and is well tolerated.

The Operation.

A muscle-splitting incision similar to but more extensive than that used in exposing the vermiform appendix is made midway between the rib margin

and the iliac crest on the appropriate side of the body, with its centre placed somewhat lateral to the sagittal plane passing through the antero-superior iliac spine. The peritoneum is not opened, but is stripped away from the muscles of the posterior belly wall by fingers working in the loose areolar tissue until the spine is reached. A long-bladed retractor is then slipped in to hold the bulging peritoneum out of the way. A head light should be used. A little blunt dissection suffices to expose the sympathetic trunk at the medial margin of the psoas muscle. The latter does not obstruct the view of the trunk as it does in the lumbar approach, and needs no retraction. The trunk is divided at the upper border of the fourth lumbar vertebra, a short segment is excised, and the grey ramus to the third lumbar nerve is divided. The wound is then closed *secundum artem*. The whole operation is usually performed in twenty minutes or less. The patient may be allowed to sit up out of bed on the fourth or fifth day after operation as a rule.

Effects of the Operation.

The effects on the lower limb are practically the same as those obtained by extensive lumbar ramisections with division of the trunk (Royle) or by ganglionectomy. I have attempted to gauge the extent of the sympathetic paralysis by placing patients in a heat-light bath until profuse sweating occurs. Sweating has been noticeably absent in the skin of the lower limb in question, except on the anterior and inner aspect of the upper part of the thigh. This absence of sweating in the lower lumbar and sacral dermatomes would seem to indicate that the sympathetic nerve fibres, joining and running with any particular lumbar or sacral nerve, control the sweat glands in that area of skin which depends for its sensation on the sensory nerve fibres contained in the nerve.

Results.

I have formed the opinion that the operation is well worth while as a rule. Gangrene is not always averted, partly because operation is often deferred until too late. Naturally, the earlier the operation, the better will be the results. The relief from pain is striking.

References.

- ¹ H. C. Trumble: "The Surgical Treatment of Constipation", *THE MEDICAL JOURNAL OF AUSTRALIA*, Volume II, 1931, page 405.
- ² F. W. Rankin and J. R. Learmonth: "Section of the Sympathetic Nerves of the Distal Part of the Colon and the Rectum in the Treatment of Hirschsprung's Disease and Certain Types of Constipation", *Annals of Surgery*, Volume XCII, 1930, page 710.
- ³ G. D. Telford and J. S. B. Stopford: "The Autonomic Nerve Supply of the Distal Colon", *The British Medical Journal*, Volume I, 1934, page 572.
- ⁴ H. C. Trumble: "The Parasympathetic Nerve Supply to the Distal Colon", *THE MEDICAL JOURNAL OF AUSTRALIA*, Volume II, 1934, page 149.
- ⁵ G. A. G. Mitchell: "The Innervation of the Distal Colon", *The Edinburgh Medical Journal*, Volume XLII, 1935, page 11.
- ⁶ J. N. Langley and H. K. Anderson: "The Innervation of the Pelvic and Adjoining Viscera", *The Journal of Physiology*, Volume XX, 1896, page 373.

Reports of Cases.

TREATMENT OF A CASE OF SEVERE DIABETIC COMA WITH HARTMANN'S SODIUM LACTATE SOLUTION

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In severe diabetic coma the derangement of carbohydrate metabolism causes incomplete combustion of fats, with the liberation of ketone bodies such as diacetic acid into the circulation. The accumulation of these substances is associated with the clinical syndrome of drowsiness or complete coma, air hunger, and circulatory and sometimes renal failure. The presence of diacetic acid can usually be demonstrated qualitatively in the urine by Gerhard's ferric chloride test, and possibly in the plasma. Conn,¹ in discussing the explanation of persistence of symptoms of severe acidosis in cases in which there is no ketonuria, refers to the suggestion of Richardson² that it may be due to a retention of diacetic acid in the plasma. He states, however, that Hartmann and Darrow,³ in a paper not accessible to us, could find only negligible quantities of ketones in the blood. An abstract⁴ of this paper states that in severe acidosis pronounced concentration of the plasma occurs with slight diminution of total base. $[\text{HCO}_3^-]$ and $[\text{Cl}^-]$ are diminished relatively more than ketone acid and protein. This statement suggests that Hartmann and Darrow were able to detect ketone acids, in possibly more than negligible amounts, in the plasma. Their method, however, is not described in the abstract. Allan⁵ mentions the use of the nitro-prusside test for the demonstration of the presence of acetone bodies in the plasma and serum.

In the case which is described below, a test suggested to us by Miss B. Splatt, B.Sc., biochemist to the Royal Melbourne Hospital, was applied to the patient's plasma. It consisted of the addition of a few drops of 10% ferric chloride solution to a similar volume of plasma on a white tile. The development of a port wine colour similar to that obtained in Gerhard's test on urine was taken to indicate qualitatively the presence of significant quantities of diacetic acid. It is generally agreed that the best quantitative test for the severity of the ketosis is the estimation of the alkali reserve of the plasma as assessed by its carbon dioxide combining power. Normally, the base in each 100 cubic centimetres of plasma is capable of combining with 50 to 70 cubic centimetres of carbon dioxide. In a state of acidosis the base is reduced, and very low figures may be recorded.

In the treatment of severe diabetic coma, when the alkali reserve is under 20%, most authorities agree that large amounts of insulin, sodium chloride and water should be administered, with sufficient glucose to balance the insulin. There is, however, a difference of opinion as to whether alkali should be given to promote a direct attack on the acidosis. In 1935 Hartmann⁶ advocated the treatment of coma by the administration of isotonic racemic sodium lactate solution by the intravenous and other routes. The lactate is slowly metabolized, liberating free alkali in the form of sodium bicarbonate. In 1937, however, Joslin and his colleagues⁷ contended that it was unnecessary to adopt this relatively complicated measure. They claimed that their results, with treatment consisting of the use of large amounts of insulin, carbohydrate and saline solution, combined with good nursing and measures to combat circulatory failure, were better than those published by Hartmann. They inferred, presumably, that the state of acidosis would be relieved by the natural processes which are available for adjustment of the acid-base equilibrium, such as the elimination of the ketone bodies by the urine and the complete oxidation of fats as a result of the accelerated metabolism of carbohydrates.

The following case is recorded, as it appears to support the contention of Conn¹ that there may be conditions under which the body is unable to adjust itself sufficiently to overcome the acidosis with the aid of the treatment described by Joslin and to indicate that in such cases treatment with the sodium lactate solution advocated by Hartmann may turn the tide and prevent a fatal outcome.

Clinical History and Discussion.

Y.P., aged fourteen years, was known to be diabetic, and had been under treatment for about eight months with diet and insulin. Her immediate past history, obtained from her father, was as follows. Four days before admission to hospital she contracted a cold in the head, with a cough and slight soreness of the throat, but there was no rise of temperature. Two days later she seemed a little drowsy, and her urine contained a moderate amount of sugar for the first time for at least two months. On the day prior to admission to hospital her cold seemed worse, and towards evening she became drowsy and the breathing was deep and sighing. Thirst was excessive, and the urine was loaded with sugar. During the night she lapsed into a stuporose condition, with rapid, deep breathing.

The patient was ordered into hospital, arriving at 11 a.m. on June 4, 1937, when she was first seen by us. Examination revealed a semi-comatose child with severe air-hunger, dry skin, sunken eyes and slightly cold extremities. If stimulated she would mumble "yes", but would immediately lapse into coma again. She was unable to swallow fluids. The pulse rate was 100 per minute and the volume was moderately good; the systolic blood pressure was 90 millimetres of mercury, and the diastolic blood pressure was 60 millimetres of mercury. The respirations were 28 per minute and the temperature was 35° C. (95° F.). The throat was slightly congested and the lungs were clear. Extensive excoriation was present around the vulva (on the following day a round, gangrenous slough appeared on the left labium, and this subsequently separated, leaving an ulcer which took four weeks to heal). The urine contained large amounts of sugar and diacetic acid. The blood sugar was 0.38%. The alkali reserve was reduced to 9% ("normal" being 50% to 70%). The blood plasma gave a strong positive reaction with the ferric chloride test described above, and with Rothera's nitro-prusside test.

A rubber catheter was passed into the bladder, and after the urine had been withdrawn the catheter was clipped off and held in position by being strapped to the thigh. The bladder was emptied every hour for the first twenty-four hours, and then at less frequent intervals. A fine stomach tube with a small metal tip was passed through the nose and fixed to the cheek with adhesive strapping. The stomach was washed out and the tube was then connected to a graduated reservoir supported on a stand two feet above the bed, and a solution of 20% glucose in normal saline solution was allowed to run in at the rate of 120 cubic centimetres (four ounces) per hour. A glass dropper and screw clip similar to those used in the intravenous apparatus were included, to regulate the rate of flow. At the end of six hours the stomach was again aspirated, to avoid the possibility of gastric dilatation. It was found, however, that most of the fluid had passed through the pylorus. This method of administering fluid to the unconscious patient proved to be highly satisfactory, and was maintained for sixteen hours, at which stage she became sufficiently conscious to swallow adequate amounts of fluid. A rectal injection of 300 cubic centimetres (ten ounces) of normal saline solution was also given on admission, and this was repeated one hour later. Two hours after the patient's admission to hospital a continuous intravenous drip of normal saline solution was begun into the internal saphenous vein at the ankle, the technique used being that previously described by one of us (I.J.W.).⁸ By this method 1,200 cubic centimetres (two pints) of fluid were given during the first eight hours of treatment (see Figure 1). In the first eight hours, 160 units of insulin were given subcutaneously and 40 intravenously, and in the second eight hours 100 units were given subcutaneously and 90 intravenously, making a total of 390 units in the first sixteen hours. The insulin given intravenously was injected by the insertion of a fine hypodermic needle through the wall of a rubber tube leading to the cannula

4. The details of the technique of administration of fluids by the continuous intravenous and intragastric drip methods are described.

Acknowledgement.

We wish to thank Dr. Charles Kellaway, Director of the Walter and Eliza Hall Institute, Melbourne, for his help, and Dr. Douglas Thomas for the assistance obtained in the laboratories under his direction at Bethesda Hospital.

References.

- ⁽¹⁾ J. W. Conn: "Treatment of Diabetic Coma", *American Journal of the Medical Sciences*, Volume CXLII, 1936, page 23.
- ⁽²⁾ R. H. Richardson: "Diabetic Acidosis with Negative Reaction for Diacetic Acid in the Urine", *Medical Clinics of North America*, Volume XVI, 1932-1933, page 257.
- ⁽³⁾ A. F. Hartmann and D. C. Darrow: "Chemical Changes Occurring in the Body as a Result of Certain Diseases; Composition of the Plasma in Severe Diabetic Coma, and Changes Taking Place After Recovery", *Journal of Clinical Investigation*, Volume VI, 1928, page 257, cited by Conn⁽¹⁾ and abstracted in *Chemical Abstracts*.⁽⁴⁾
- ⁽⁴⁾ A. Grollman: *Chemical Abstracts*, Volume XXIII, 1929, page 189.
- ⁽⁵⁾ F. N. Allan: "Diabetic Acidosis and Coma", *Medical Clinics of North America*, Volume XVI, 1932-1933, page 1277.
- ⁽⁶⁾ A. F. Hartmann: "Treatment of Severe Diabetic Acidosis", *Archives of Internal Medicine*, Volume LVI, 1935, page 413.
- ⁽⁷⁾ E. P. Joslin, H. F. Root, P. White, A. Marble, and A. P. Joslin: "Diabetic Coma", *Archives of Internal Medicine*, Volume LIX, 1937, page 175.
- ⁽⁸⁾ I. J. Wood: "The Technique of Continuous Intravenous Administration of Glucose-saline Solutions and Blood", *THE MEDICAL JOURNAL OF AUSTRALIA*, Volume II, 1936, page 843.
- ⁽⁹⁾ A. F. Hartmann: "Theory and Practice of Parenteral Fluid Administration", *Journal of the American Medical Association*, Volume CIII, 1934, page 1349.
- ⁽¹⁰⁾ Martindale: "Extra Pharmacopœia", Twenty-first Edition, 1936, Volume I, page 74.

Reviews.

PROGRESS IN INDUSTRIAL HYGIENE.

A TEXT-BOOK on industrial hygiene, smaller and less expensive than the few standard works in the English language, should be acclaimed; for there is a need for such a work for students; and "Recent Advances in Industrial Hygiene and Medicine", by T. M. Ling, raises the hope that here is a book that will fill the bill.¹

It is well written and set out, and deals in a clear way with the environment of the worker and industrial psychology, with a large, useful and well-selected list of recent publications on these subjects. Here lies the strength of this book, and not in those parts devoted to occupational diseases, except neuroses. In the accounts of the industrial maladies there comes a photographic quality; the writer does not appear as an artist who has had to paint his picture and put in it the personal outlook which is the product of the difficulties he has encountered in his work. In the article on dust and its effects there is no mention of Owens's dust sampler; and the use of data to 1924 dealing with Rand miners to show that "despite extensive medical care and preventive measures, the number of cases of silicosis has not decreased to the extent hoped for" when much more recent and optimistic information is available, is regrettable. Dr. Irvine, Chairman of the South African Miners' Phthisis Medical Bureau, in his report of 1936, states: "Compared with the position twelve or thirteen years ago, in the period 1920-23, the general liability of the working miners as a whole to contract silicosis had in 1934-35 fallen by 64 per cent." The outstanding work of Lyle Cummins on coal miner's lung goes unmentioned. In the chapter on lead poisoning,

the author fails to stress the fact that the primary and chief action of lead as an industrial poisoning is to cause "lead anemia" by the hemolysis of the red blood cells. If this anemia is detected and treated, lead palsies will not develop. Of the symptoms of lead poisoning, the very commonly occurring arthralgias are not mentioned. In the toxic gases the classification of gases by Henderson and Haggard is begun, but after Group I (asphyxiants) is discontinued. This reminds one of the method of editing the famous eleventh edition of the "Encyclopædia Britannica" to produce the much less famous fourteenth edition. Methyl chloride is placed with the asphyxiants and not with the group of anæsthetic gases. This chapter is a medley which will be of little use in the logical teaching of a student. The chapter on industrial dermatoses has been pruned almost to a stock of tables and headings, but the few shoots left are soundly dealt with. Despite the weakness of the chapters on occupational disease, except neuroses, this is a useful small book on industrial hygiene; the format is excellent.

OBSTETRICS.

"A TEXTBOOK OF OBSTETRICS", by E. A. Schumann, which has appeared for the first time, is too large to serve as a text-book for students, but for the general practitioner it would be useful.² In the practice of medicine it is the small points which often spell success or failure, and by mentioning these in his book the author shows that he is well acquainted with all details of his subject. An occasional jar is received by the reader, as when the author states that a craniotomy is sometimes done for accidental hæmorrhage, and when he omits to state that true labour pains or contractions should be present for the safe application of forceps. The author is opposed to control of the uterine fundus during the third stage, and prefers Cæsarean section to trial labour in cases of contracted pelvis. The obstetrician who follows this advice will perform many unnecessary sections and will never acquire a sound and accurate obstetrical judgement in this condition. The author sums up the case for three- or four-hourly feeding correctly. The obstetrician has to see that milk is produced; the feeding of the baby every three hours is therefore advocated. The section on puerperal infection is well written. The author is a believer in Klelland's forceps. The chapter on *post partum* hæmorrhage is not well written and could be improved, as also could that on breech delivery. The illustrations are many and good.

HOUSTON'S "ART OF TREATMENT".

"THE ART OF TREATMENT" is the work of Professor William R. Houston, formerly an occupant of the chair of clinical medicine in the University of Georgia.³ In the book is collected the subject matter of a series of discussions held at various times with senior students and young doctors concerning treatment. The author states that his work has been presented as an answer to the statement that therapeutics is a subject not properly taught in medical schools and hospitals.

Professor Houston presupposes, on the part of his readers, a knowledge of pharmacology and a practical acquaintance with the technique of such procedures as lumbar puncture, venesection, the induction of pneumothorax, and the administration of the commoner anæsthetics. Further than this, the student is expected, through previous reading, to possess an acquaintance with

¹ "A Textbook of Obstetrics", by E. A. Schumann, A.B., M.D., F.A.C.S.; 1936. Philadelphia and London: W. B. Saunders Company; Melbourne: W. Ramsay. Medium 8vo, pp. 780, with 581 illustrations. Price: 40s. net.

² "The Art of Treatment", by W. R. Houston, A.M., M.D., F.A.C.P.; 1936. New York: The Macmillan Company; Australia: Angus and Robertson Limited. Medium 8vo, pp. 752. Price: 35s. net.

³ "Recent Advances in Industrial Hygiene and Medicine", by T. M. Ling, M.A., B.M., M.R.C.P., with a foreword by J. A. Nixon, C.M.G., M.D., F.R.C.P.; 1937. London: J. and A. Churchill Limited. Large crown 8vo, pp. 220, with 29 illustrations. Price: 12s. 6d. net.

the etiology, pathological physiology, the course and duration, and the prevention of the various diseases discussed. A discussion then commences at the point where the treatment of the patient comes under consideration.

At the outset the author discusses the art of treatment in general terms. He then turns to the consideration of those diseases—not a few in number—in which good nursing is the biggest part of the treatment, and he cites typhoid fever and several common disorders as coming under this heading. The value of specifics and of psychotherapy is thoroughly considered, after which cardiac, pulmonary and systemic disorders are dealt with in turn.

It may be said that Professor Houston has added nothing very new to our clinical and therapeutic knowledge, and probably he had no such intention; it is likely that he means the book to be what it is—a useful and comprehensive manual to be read by advanced undergraduates and hospital resident medical officers. It should admirably fulfil this purpose. The author writes in a style which makes reading easy; he never hesitates to season his teaching with relevant anecdote, and has introduced many case histories drawn from his own experiences during the course of his medical work in the United States of America and in China. Besides an excellent index, the book contains an exhaustive list of celebrities, medical and lay, who are mentioned in the text.

OPERATIVE SURGERY.

"OPERATIVE SURGERY", by Horsley and Bigger, is mainly devoted to the technique of operations.¹ In the preface H. V. Horsley states that "particular stress has been laid upon the preservation of physiologic function and the interpretation of the biologic processes that follow surgical operations". This is done mainly in chapters devoted to such subjects as surgical drainage, reversal of the circulation, the causes of cicatricial contraction *et cetera*. The chapter on drainage, which deals with the possibility of the reversal of lymph flow, is particularly interesting. This general idea is well maintained also in the chapters dealing with the actual technique. One exception is that in the discussion of operations for hernia no mention is made of the sphincter action of the muscles attached to the conjoined tendon, a matter which is of vital importance.

The operations described are all "live" operations, and there is no "dead" work in the book. One surprising thing is that there is no mention of the Harris operation of prostatectomy. The illustrations are excellent and, above all, the book is very sound.

There is no doubt that a work of this kind, which is concerned mainly with technique, is of great value. It is of value, however, mainly to the experienced surgeon, who knows all about pre-operative and post-operative care and who is accustomed to forming his own opinions on matters of surgical judgement. The younger surgeon, who requires enlightenment in difficult situations, will not find this book of sufficient value. For instance, if he wishes to find out whether to remove the gall-bladder when a stone has been impacted in the common duct, he will find no discussion of this matter. Nor, as another instance, is there any indication as to the age at which the operation for hypospadias should be performed. Again, if he wishes to engage in thyroid surgery it is very necessary that he should thoroughly understand the appropriate pre-operative and post-operative measures, and these again are outside the scope of the book.

The authors, of course, make it quite clear that they do not include such matters within their scope, but this is the more disappointing for the reason that they are

obviously men with strong personalities, and the reader finds himself repeatedly wanting to know what their actual opinions are. They have written a book which is of great value to experienced surgeons. If they wrote another as a commentary on this one, it would be of great value to all surgeons, experienced and inexperienced alike.

Notes on Books, Current Journals and New Appliances.

ENDOCRINOLOGY.

No subject at the present time is of more importance to the general practitioner than the endocrines and the part which they play in health and disease. All members of the British Medical Association in Australia receive *The British Medical Journal*, and all will have seen the articles published recently on endocrinology. The articles that have appeared from October 19, 1936, to May 15, 1937, have been reprinted in book form.¹ They have been written by recognized authorities on the subject, and even those members of the Association who keep their journals will be glad to have this series of articles collected under one cover in a volume that is well printed and easy to read.

ESSAYS IN MEDICINE.

THE first four essays delivered in Sydney by Professor Jonathan Meakins, of McGill University, Montreal, under the auspices of the New South Wales Post-Graduate Committee in Medicine in the University of Sydney, have been published in book form.² The volume also includes the second Sir Charles Clubbe Memorial Oration, entitled "Unveiling the Mystery of Growth", that was published in this journal. The first essay is entitled "Circulatory Collapse: its Cause and Cure"; the second is entitled "Respiratory Failure"; the third, "Anæmia as a Common Disability"; and the fourth, "The Interpretation of Blood Chemistry in Renal Lesions". Those who attended these lectures will doubtless be glad to have a permanent record of them.

WORK AT THE BAKER INSTITUTE, MELBOURNE.

THE third volume of the collected papers of the Baker Institute of Medical Research, Melbourne, has been published; it bears the date September, 1937.³ The volume contains fifty-five papers that have appeared in divers journals; of these, thirty-six have been published in *THE MEDICAL JOURNAL OF AUSTRALIA*; two were published in *The Australian and New Zealand Journal of Surgery*; one was published in *The Australian Journal of Experimental Biology and Medical Science*, and one was published in the transactions of the fourth session of the Australasian Medical Congress (British Medical Association). The remaining papers were sent overseas for publication. The director has wisely had the reprints of the several articles reproduced in a uniform crown quarto size. The volume is one of which the institute may well be proud.

¹ "The Endocrines in Theory and Practice. Articles Republished from *The British Medical Journal*"; 1937. London: H. K. Lewis and Company Limited; Australia: Angus and Robertson Limited. Demy 8vo, pp. 287. Price: 9s. net.

² "Medical Essays", by J. C. Meakins, M.D., F.R.C.P.; 1937. Australia: Angus and Robertson Limited. Demy 8vo, pp. 188, with illustrations. Price: 10s. 6d. net.

³ "Collected Papers of the Baker Institute of Medical Research, Alfred Hospital, Melbourne. Number III, Containing 55 Papers"; 1937. Melbourne: The Baker Medical Research Institute. Crown 4to, with illustrations.

¹ "Operative Surgery", by J. S. Horsley, M.D., LL.D., F.A.C.S., and I. A. Bigger, M.D., with contributions by C. C. Coleman, M.D., F.A.C.S., J. S. Horsley, Junior, M.D., A. I. Dodson, M.D., F.A.C.S., and D. M. Faulkner, M.D.; Volumes I and II, Fourth Edition; 1937. St. Louis: The C. V. Mosby Company. Super royal 8vo, pp. 1411, with illustrations. Price: \$15.00 net.

The Medical Journal of Australia

SATURDAY, NOVEMBER 27, 1937.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

MOTOR CAR DRIVING AND INTOXICATION.

THE problem of the intoxicated motor car driver becomes daily more and more insistent. The potentialities for great speed with an automobile are too readily converted into actualities, with resulting peril to life or limb. After an accident the question at once arises as to whether the driver was or was not intoxicated. It must be frankly and freely admitted that there is no one unequivocal clinical sign of intoxication. An alcoholic odour on the breath may be very fallacious. At the most it indicates merely that some alcoholic beverage has been consumed, and does not necessarily imply drunkenness. A common and futile procedure is to ask the person concerned to utter some trick word—a word which total abstainers may have difficulty in pronouncing. It may be impossible to differentiate between alcoholic intoxication and some disease of the nervous system. When, after an accident, a driver is brought to trial in the courts there is invariably a conflict of testimony between the police and a medical practitioner giving evidence on behalf of the accused. A learned judge once said that he believed the police and not the medical

witness. This attitude is often justified. The medical witness may find difficulty in giving his evidence to help the court; he is often unconsciously a special pleader, doing his utmost to help his friend or patient. He would appear to be biased from the very outset. This point was emphasized recently in this journal by Mr. F. V. Smith, a prominent member of the South Australian bar. Of course the police witness may also be biased, but perhaps not to the same degree. The shock of an accident may set up manifestations closely resembling alcoholic intoxication. Another point of importance is that intoxication may be relative to the work in hand. For instance a man somewhat under the influence of alcohol may be able to sit perfectly upright and not imperil his own safety or that of others. The same man might be able to walk or ride or drive a horse quite well, whereas, if he attempted to drive an automobile, disaster might follow. Some judicial authorities, however, will not recognize such degrees, and will admit of no compromise. The accused is either drunk or sober. It is of the greatest importance not only that society should be protected from the intoxicated motor driver, but also that an abstemious driver should not have his liberty imperilled by a false charge of drunkenness in the courts.

Some years ago E. Bogen advocated that the urine and expired air of suspects should be chemically analysed to ascertain the percentage of alcohol. Bogen considered that no patient having less than one milligramme of alcohol in a cubic centimetre of urine was intoxicated. More than half of those with from one to two milligrammes, three-quarters of those with three milligrammes, and practically every one of those with four or more milligrammes were diagnosed as being in a condition of drunkenness. In dealing with the question from a chemical standpoint we must not lose sight of conditions of tolerance and idiosyncrasy. Tolerance has been explained in many instances as being due to increased oxidation or, on the other hand, to retarded absorption. But not every case is thus explained. Some persons, especially those habituated to the use of alcohol, may take considerable quantities and remain quite sober.

Others, particularly neophytes, may be profoundly affected by very much smaller amounts. This tolerance, to some extent, vitiates such a chemical test as the estimation of the amount of blood alcohol. The amount of blood alcohol is an indication of the quantity of alcohol imbibed, but, as Professor A. J. Clark has pointed out, it does not indicate the effect produced on the patient, as there is a wide individual variation in regard to alcohol concentration in the blood and intoxication.¹ He estimates that one individual in a thousand would not be intoxicated by about four times the blood alcohol concentration that intoxicates 50% of the population. It is important to remember that the courts deal with individuals and not with averages. The blood alcohol test in general use is that of E. M. P. Widmark, described in 1932. Both the method of Widmark and the earlier method of Bogen are subject to fallacies. It is obvious, of course, that the period of time that has elapsed after the taking of the alcohol will profoundly affect the findings. In making the test, punctilious attention to detail is necessary. The distillation flasks must be thoroughly cleaned, steamed and dried. The method of estimation depends on the presence in the blood of a volatile reducing substance, and in consequence sources of error arise from the administration of anaesthetics such as chloroform and ether, consumption of paraldehyde and methyl alcohol, and the presence of acetone. The possibility of an unjust accusation against a diabetic or one suffering from ketosis is obvious. A. J. Clark states that the results of examinations by the methods of Bogen and Widmark agree in demonstrating that a concentration of alcohol in the blood of 1.2 milligrammes per 100 cubic centimetres produces intoxication in 50% of the cases. Bogen's figures demonstrated that there was no intoxication when the alcoholic content was less than one milligramme per 100 cubic centimetres. Widmark did not find intoxication with an alcoholic content less than 0.8 milligramme. Clark further states that the ratio between the alcohol concentration not intoxicating the most resistant individuals and that affecting the least resistant persons was about fourteen to

one in Bogen's series and three to one in Widmark's series. These divergences demonstrate that the blood alcohol findings are not sufficiently accurate to be of absolute value in the determination of sobriety.

J. Davidson and L. C. Nickolls, writing from the metropolitan police laboratory at Hendon, admit that the Widmark method suffers from the drawback that the quantity of blood available is small.¹ They further consider that either blood or urine may be used, and state that the ratio of alcohol in blood to that in urine varies about a mean figure of 1:1.35. A chemical investigation of the urine is much more readily made than one of the blood. Davidson and Nickolls conclude that an alcohol concentration between 100 and 150 milligrammes per 100 millilitres is the threshold concentration necessary to produce clinical evidence of intoxication. They emphasize the fact that in trials for sobriety the fears of the innocent are unfounded in fact. Of the persons charged with being under the influence of drink to a sufficient extent to render them incapable of having proper control of a vehicle, those who had less than 100 milligrammes per 100 millilitres were found "not guilty". It would seem that the blood alcohol test does not penalize the guilty, but is of the highest value to the innocent. We may conclude that the estimation of alcohol in the blood or urine gives valuable information as to a person's sobriety; but the last word has not yet been said, as the ever-present possibility of extreme tolerance or idiosyncrasy militates against the conclusiveness of such chemical tests.

Current Comment.

ECZEMA FROM DYED CLOTHING.

FUR DERMATITIS has long been known and, in addition to considerations of workers' compensation, such dermatitis has been a fruitful source of litigation. It is well known that phenylenediamine dyes will set up great irritation and severe dermatitis when in contact with the skin of susceptible persons through the instrumentality of dyed furs. Paraphenylenediamine is frequently employed as a hair dye, and workers engaged in the manufacture of this compound are often the victims of severe

¹ *The British Medical Journal*, August 14, 1937.

¹ *The British Medical Journal*, August 28, 1937.

injury. This injury has been attributed to diamine itself and its oxidation products. Fur dermatitis has been particularly noted in what are known in trade circles as "beaver-coney" pelts, these pelts being really derived from rabbits. In dyeing the furs it was found that the darker the colour obtained, the less likely was it that the skin irritation would be produced. With each progressive stage of oxidation of the dye the less was any tendency to cause skin irritation, and the deeper was the colour. Metaphenylenediamine has very poisonous attributes, resembling those of ptomaines and leucomaines.

J. F. Burgess points out that eczema arising from contact with dyed clothing, apart from fur collars, has been accorded scanty mention in the literature.¹ The combined statistics from the labour commissions of New York and Ohio show that in 1934, of about 1,600 cases of occupational dermatitis, 45 were attributed to dyed fabrics. L. Schwartz found that two instances of dermatitis of the hands occurred in thirty-six factory dyers, who worked in chrome and chrome colours. Patch tests demonstrated that both patients were hypersensitive to chrome colours. In 1931 an instance caused by a dyed dress was reported by Lomholt. F. Blumenthal and K. Jaffe have recorded two cases. In one of these a reaction followed the use of blue clothing; in the other the clothing was brown. F. A. Simon and F. M. Rackemann relate the case of a man who suffered from eczematous eruptions resulting from dyes in his clothing, stockings, garters and hat bands, as well as in the upholstery of his furniture and automobile and in his wife's dresses. In 1936, P. Bonnevie and V. Genner observed fifteen cases of this type of eczema in persons whose dress material had been dyed blue.

Burgess remarks that dermatitis may follow short or prolonged contact with such dyed fabrics as dresses, dress shields, collars and socks, but, when it is remembered that most fabrics are dyed it will be realized that merely a very small proportion of persons are affected by dyed fabrics. As a rule the actual cause needs to be ascertained by making patch tests with the dyed fabric which is worn. It has been stated that when a dye causes dermatitis it generally comes off the fibre upon the skin. To use the technical term, the garments "bleed". In the production of this allergic reaction important factors may be the many different chemicals employed in the actual processing of the dyes. In dyeing, silk chrome dyes are often employed, involving the presence in the dye of potassium bichromate. In other dyes different acids and alkalis and other chemical agents are likewise employed. Also some states of the skin tend to promote hypersensitivity. The hydrogen ion concentration of human perspiration varies from pH 4.85 to pH 7.4. Also the hydrogen ion concentration of sweat varies in different areas of the body at the same time. Some dyes more readily dissolve out of fabrics by acid than by alkaline sweat. In other

cases the reverse happens. Schwartz has suggested that when patch tests yield no reaction in eczema apparently due to dyed fabrics, the material used in the test should be moistened with the patient's own axillary sweat.

Burgess describes six clearly defined cases resulting from hypersensitivity to contact with dyed clothing. He identifies a particular syndrome in which the type of eczema occurs only in women and is localized to such parts as are in immediate contact with the dyed substance. The history obtained from the patient showed that the eruption had followed shortly after wearing a new or redyed dress. In all six cases the fabric was a silk crêpe. The dermatitis was invariably restricted to the axillæ; the front and back of the chest, corresponding exactly to the part not protected by the slip and coming into contact with that portion of the dress; the upper arms; the antecubital fossæ and the sides of the neck. Occasionally there was some implication of the face. The lower margin of the eruption often was clearly defined from the normal skin by a horizontal line extending anteriorly and posteriorly from axilla to axilla. In the areas indicated the eruption was generally an acute diffuse erythematous inflammation. As a rule the eruption was most pronounced where hyperidrosis existed, as in the axillæ and antecubital fossæ, where, owing to its excessive thinness, the skin is prone to react. In some cases the eruption was finely vesicular and sometimes marked exudation occurred. There was generally intense irritation. In one of the cases here recorded the eruption had persisted for a long time and there were small multiple follicular abscesses on the back, together with erythematous scaling. The condition resembled seborrhæic eczema.

The cause of the dermatitis may be suspected from the clinical history and character of the lesions. In three of the cases recorded by Burgess it followed within a few days of the wearing of a new silk crêpe dress. In the other three it supervened upon contact with a redyed dress. In three of the cases the colour of the dress was black, in one brown, and in two blue. In all cases positive reactions followed patch tests. The value of this test was clearly shown as a means of elucidating the causative agent, as a number of dyed materials had been worn and the patient might have become sensitized to any of them. Burgess confined himself in the tests to the actual dyed materials worn. In one of the cases the clinical picture resembled a mycotic axillary infection, but no fungus could be found, and positive patch tests of the dress material established the diagnosis. One of the patients had multiple sensitivity. She had previously been found sensitive to horse-hair, tomatoes, corn, wheat and eggs. During this investigation patch tests demonstrated that she was sensitive to the dye of a squirrel fur as well as the brown silk dress material. Two excellent figures illustrate the article by Burgess, which is a valuable contribution concerning a condition which may be a prolific cause of litigation.

¹ The Canadian Medical Association Journal, September, 1937.

Abstracts from Current Medical Literature.

GYNÆCOLOGY.

Blood Plasma Transfusion for Menorrhagia.

A. ALOVSKI AND E. BURCEVA (*Monatsschrift für Geburtshilfe und Gynäkologie*, March, 1937) discuss the use of blood plasma in gynecological hæmorrhage due to various causes. They have used blood plasma which has been stored for varying periods up to two years. Citrated blood is stored in the ice chest for two to three days. Under strict aseptic precautions the plasma is collected into ampoules containing 10 to 50 cubic centimetres. These are kept in the warm chest for three days and tested for sterility before being used. The best results were obtained in cases of *metropathia hæmorrhagica* and juvenile menorrhagia. The amount generally given was 40 to 55 cubic centimetres intravenously. In about two-thirds of the cases there occurred a non-specific protein reaction which did not correspond in intensity to the amount of serum injected. It was observed that the greater the reaction produced, the better was the hæmostatic effect. In more than half the cases the blood loss ceased after the first day.

Cystitis in the Female.

J. RIVOIR (*Monatsschrift für Geburtshilfe und Gynäkologie*, July, 1937) discusses the etiology of trigonitis in the female, and in particular the rôle played by the vaginal secretions in this condition. Careful examination of the urethral secretion in many cases of cystitis will reveal many organisms besides gonococci. In chronic leucorrhœa cystoscopic examination will always reveal chronic inflammation of the urethra and trigonitis of the bladder. In elderly females a chronic trigonitis is generally present, though it may cause few symptoms. With these patients intermittent acute attacks may occur and are due to fresh infection from the vaginal secretions. The condition is treated by bladder irrigation with silver nitrate solutions. Prevention consists in careful vaginal douching to remove any discharge which may be present.

A Chemical Test for Pregnancy.

J. E. SAVAGE AND H. BOYD WYLIE (*American Journal of Obstetrics and Gynecology*, May, 1937) report the result of their investigations of the levels of œstrin in the blood and urine in the late toxæmias of pregnancy. The chemical test for œstrin was used in order to eliminate the variable biological factors. The method was described by Schulmowitz and Wylie, and they have been able to show a normal level of œstrin in late pregnancy and to show a definite lowering

in chronic nephritis of pregnancy and in preeclampsia. Sixty patients who were in hospital in the last trimester of their pregnancies were carefully studied from the clinical point of view, and complete twenty-four-hour urine specimens were examined for œstrin. While the line of demarcation is not sharp in 30% of the cases, it has been possible to divide 70% into those normal patients who were free from any evidence of toxæmia, those patients suffering from chronic nephritis complicating pregnancy, and those whose clinical diagnosis was preeclampsia. The average œstrin excretion expressed as the "ferric chloride number" for 21 normal cases was 83.30; for 19 cases of chronic nephritis complicating pregnancy, 51.67; and for 20 cases of preeclampsia, 36.87.

Post-Operative Anuria.

F. HEIMANN (*Monatsschrift für Geburtshilfe und Gynäkologie*, June, 1937) describes a case of suppression of urine following an operation. He had performed a supravaginal hysterectomy for fibroids, and the patient was well on the second day except for suppression of urine. The ureters were catheterized and "Uroselectan" was injected with negative results as far as the presence of stone was concerned. The abdomen was reopened and both the operation area and the ureters were found to be quite free. Catheters were left *in situ* and a copious flow of urine resulted. The author is at a loss to account for the complete suppression, and can ascribe it only to some reflex inhibition of the kidneys.

Pregnancy Following Cervical Operations.

A. GRAF (*Monatsschrift für Geburtshilfe und Gynäkologie*, June, 1937) discusses the likelihood of pregnancy following operations on the cervix, such as amputation or cauterization for erosion. The general opinion of many authors that subsequent pregnancies are liable to be abnormal is corroborated by the author's observations. In 21 cases amputation of the cervix was performed, and only four patients subsequently became pregnant and went to term. Two had normal deliveries, one had a section for a transverse presentation, and the fourth had a stillborn child following a shoulder lie. Twenty-five patients were treated with the cautery and only nine became pregnant. Of these, two had abortions and the remainder went to term. The author considers that such operations tend to destroy the natural secretions of the cervix and so hinder conception.

The Effect of Gynecological Lesions on the Upper Urinary Tract.

H. L. KRETSCHMER AND A. E. KANTER (*The Journal of the American Medical Association*, October 2, 1937) has by a pyelographic study investigated the effect of certain gynecological lesions

on the upper urinary tract. The author finds that the incidence of changes in the urinary tract is high. His series includes fifty-one cases. Evidence of change in the upper urinary tract was found in 64.7%. In a group of fibroids changes were found in 65.7%, in ovarian cysts in 81.9%, and in prolapse in 25%. In one case of tubo-ovarian abscess there was no change in the upper urinary tract. The author states that the frequency with which urinary lesions occur has not been appreciated, because those patients who do not present urinary signs and symptoms have not been subjected to routine examination. He finds that after appropriate surgical procedures have been carried out, a return to normal takes place in 72.5% of cases. Finally, he believes that pyelographic examination should be carried out in all cases in which recovery has not occurred when the patient leaves hospital.

Vesico-Vaginal Fistulæ.

M. DOUGLASS (*Surgery, Gynecology and Obstetrics*, October, 1937) reports four cases in which she has used the Young technique for the closure of inaccessible vesico-vaginal fistulæ. In this technique the transvesical route, originally proposed by Trendelenburg, is used. The method was first used by Young. A suprapubic incision is made into the bladder. The mucosa is incised and reflected from the fistula. It is closed by concentric purse-string sutures which evaginate the fistula into the vagina. The mucosa is sutured with interrupted chromicized number 00 catgut sutures. The anterior bladder wall is closed with interrupted plain catgut sutures and a large suprapubic catheter is inserted. In addition to the suprapubic drain the author has drained the space of Retzius for twenty-four to thirty-six hours. She has also found that it is useful to elevate the fistula by means of a small hook or safety pin, as suggested by Young. The author states that the availability of the operable field and the relatively easy exposure of the fistula can scarcely be imagined by a surgeon accustomed only to employing the more difficult classical approach. The field can be kept dry and sutures can be placed accurately with comparatively little trauma. The author believes that this is the most suitable way of treating small but inaccessible vaginal fistulæ.

OBSTETRICS.

Analgesia with the Barbituric Acid Derivatives in Labour.

T. L. MONTGOMERY (*American Journal of Obstetrics and Gynecology*, May, 1937) discusses the question of analgesia with barbituric acid derivatives and its relationship to maternal mortality. After examining the statistics the author comes to the conclusion

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that it is questionable whether "Nembutal"-scopolamine amnesia fulfils the requirement of safety. If the patient is in constant danger of injuring or contaminating herself, if her cooperation in the course of labour is utterly lost, if the incidence of operative interference is multiplied tenfold, if the supervision of delivery is transformed from an intelligent conduct of labour into the treatment of drug confusion, it is doubtful whether the effect is worth the reaction produced. This method is at the height of its popularity. Reports of recent publication have been favourable, as they are always at such time. However, now that the method is getting away from the centres of its propagation and is being put into more general use, questions are arising as to efficacy, difficulty of management, and sudden death. In the light of such relentless scrutiny it appears uncertain that deep analgesia with the barbiturates is completely safe or fully reliable. It is questionable whether the widespread acceptance of this method is a step forward in obstetric practice.

Analysis of Forceps Deliveries.

J. ERBSLÖH (*Monatsschrift für Geburtshilfe und Gynäkologie*, January, 1937) presents an analysis of 602 forceps deliveries at the Danzig clinic. The frequency of forceps application was 5.38% with 11,183 births. A comparison with the records of previous years shows an increase in the rate due to the increase of first births and the higher proportion of elderly primiparae. This tendency not only causes the more frequent use of forceps, but is also associated with greater difficulties owing to rigidity of the soft parts. The author found no relationship between premature rupture of the membranes and the forceps application. The increased number of male deliveries also caused trouble because of the greater weight of boys and consequent risk of cerebral hemorrhage. Five maternal deaths were noted and the stillbirth rate was 5.8%. Puerperal sepsis caused a morbidity rate of 14.4%. In about one-third of the cases in which forceps were applied for foetal distress, complications associated with the cord were noted. Two-thirds of the cases in which maternal distress occurred, were associated with uterine inertia, despite the use of pituitary extract. Finally the author maintains that, given correct indications for the use of forceps, the results should be good, and that there is no reason for an increased incidence of abdominal delivery.

Effect of Rupture of Membranes on Labour.

H. GUTHMANN AND D. ENDRES (*Monatsschrift für Geburtshilfe und Gynäkologie*, May, 1937) discuss the effects of rupture of the membranes on the duration of labour. They divided their cases into three groups: those in which rupture occurred nor-

mally at the end of the first stage, cases of premature rupture of the membranes, and those in which artificial rupture of the membranes was performed before the onset of labour. In opposition to the general view, they consider that artificial rupture of the membranes, whether the pregnancy be premature or postmature, results in a quicker delivery because of the shortening of the first stage. The absence of the hydrostatic action of the forewaters does not seem to have any ill-effect. Premature rupture of the membranes is apparently associated with a prolongation of labour, especially in the first stage and owing to primary uterine inertia. After tabulating their results, the authors consider that it is not correct to give medicinal stimulation in cases of spontaneous rupture of the membranes when no contractions have occurred, since it may interfere with the normal action of such rupture of the membranes in the first stage of labour.

Cranial Injuries During Breech Delivery.

T. BRANDER (*Monatsschrift für Geburtshilfe und Gynäkologie*, May, 1937) discusses the intracranial injuries noted in cases of breech delivery. The incidence of such injuries depends largely upon the method of delivery. When the delivery is normal and unassisted the mortality is low; it is highest when breech extraction is performed, while assistance to deliver the infant causes an appreciable increase in the risk. Naturally premature children fare worse because of the greater compressibility of their skulls. The author believes that in the survivors the incidence of subsequent epilepsy, spastic paralysis and general amentia is somewhat excessive. Therefore, because of this risk he considers that in breech cases the patient should be delivered by Caesarean section, and he does not mention the possibility of prophylactic version for many of the patients.

Abdominal Paracentesis for Hydramnios.

A. MAYER (*Monatsschrift für Geburtshilfe und Gynäkologie*, February, 1937) discusses the value of abdominal paracentesis in hydramnios when pressure causes urgent symptoms of acute circulatory failure. He has performed the operation in twelve cases. The technique is simple. After the bladder has been emptied and a local anæsthetic has been used for the skin, the uterus is tapped with a trocar midway between the symphysis and the umbilicus in the mid-line. The amount of liquor amnii removed varied from 850 to 375 cubic centimetres, and the immediate effect on respiratory distress was noteworthy. To prevent the onset of labour morphine was given. Labour ensued at varying periods from a few days to ten weeks. In the absence of labour the hydramnios

tends to recur within a few days and may require further tapping. No ill-effects have been noted nor has there been any damage to the foetus. Naturally, if *placenta previa* is suspected, the procedure should not be adopted.

The Aetiology of Premature Delivery.

E. ENNEPER (*Monatsschrift für Geburtshilfe und Gynäkologie*, July, 1937) has investigated premature deliveries in a series of 92 cases. Many of these were due to such causes as toxæmia and *ante partum* hemorrhage, but there remained a group of 20 cases in which no cause could be found. From an analysis of the histories the author believes that it was due to constitutional factors. Both the histories of the patients themselves and of their families showed a definite hypoplastic ovarian function, as evidenced by late onset of menses or scanty periods. He attributes this to the after-effects of malnutrition during the War and the immediate post-war period in Germany. Therefore, prevention is concerned with the proper functioning of the ovaries from puberty by a balanced diet and, if necessary, administration of hormonal preparations.

Zonal Placenta.

H. TASCH (*Monatsschrift für Geburtshilfe und Gynäkologie*, July, 1937) describes a case of zonal implantation of the placenta. In such cases the placenta takes the form of a girdle encircling the uterine cavity. He has summarized the literature on the subject, which shows that the majority of cases are associated with a history of previous inflammation or injury of the endometrium following a septic abortion or delivery, repeated curettage or fibroids. Clinically such an insertion of the placenta may give rise to *ante partum* hemorrhage or occasionally may prevent the fixation of the presenting part. In the author's case severe *post partum* hemorrhage was noted and manual removal of the placenta was required.

Medicinal Induction of Labour.

F. MOVERS (*Monatsschrift für Geburtshilfe und Gynäkologie*, January, 1937) has analysed his results in inducing labour with various medicinal methods. In a previous communication he had shown 63% success with the use of castor oil, quinine and pituitary extract in a series of 238 cases. In a further series of 213 cases only 40% of women were delivered within twenty-four hours of the injections. From his observations a combination of quinine and pituitary extract was found to give better results than one comprising quinine, calcium and pituitary extract. Quinine and calcium were better than quinine alone. Little success was obtained by the use of "Cardiazol", quinine and pituitary extract. The highest percentage of success followed the use of medicinal induction in cases of postmaturity.

British Medical Association News.

SCIENTIFIC.

A MEETING of the South Australian Branch of the British Medical Association was held at Kapunda on September 25, 1937, Dr. R. E. MAGAREY, the President, in the chair.

The Medical Treatment of Pneumonia.

Dr. J. G. SLEEMAN read a paper entitled "The Medical Treatment of Pneumonia" (see page 939).

Surgical Complications of Pneumonia.

Dr. D. G. MCKAY read a paper entitled "Surgical Complications of Pneumonia" (see page 944).

Dr. S. R. BURSTON was pleased that Dr. Sleeman had emphasized the necessity for allowing the patient to adopt the position of greatest comfort. He thought it wise to give some oxygen in the early stages, for two reasons: first, the patient should be made accustomed to its administration in case it should subsequently be necessary; secondly, if it was given when the patient was more desperately ill, the relatives were apt to think that oxygen indicated the last stages of the disease. He also stressed the value of morphine. He thought serum treatment was of definite value if given early. He thought that attention to the minute details of treatment was very important and that good nursing was essential.

Dr. E. F. GARTHELL agreed heartily with the methods of obtaining sufficient rest for the patient, especially the use of morphine and the placing of the patient in a comfortable position. As peripheral failure was such an important feature in toxic cases of pneumonia, the upright posture often exerted a deleterious effect by impeding the already insufficient venous return. Actual cardiac failure was practically limited to those patients who had some pre-existing cardio-vascular disease. The question of digitalis was an unsolved problem. Many authorities, supported by statistics, had concluded that the exhibition of this drug was merely adding another toxic substance to those already destroying the patient's health. Even in the presence of that rather uncommon complication, auricular fibrillation, there was no unanimity of opinion regarding the merits of this drug. In one series fibrillation in a few young patients appeared to be due to digitalis. In the treatment of peripheral failure, if toxæmia was sufficiently virulent, no drug treatment was of avail, but in the milder cases intravenous injections of a 25% solution of glucose might tide the patient over. He wished to ask Dr. Sleeman how many of his cases had been complicated by pericarditis, which was usually considered a rarity.

Dr. K. S. HETZEL said that in considering pneumonia one had to remember that in some places it adopted a more serious form. In some epidemics in the United States of America the mortality was as high as 40%. Artificial pneumothorax was often impracticable and was nearly always of rather doubtful value. It certainly relieved pain and occasionally reduced the toxicity, but its complications were by no means uncommon and were usually troublesome. With regard to serum, typing in South Australia was as yet in its infancy. Undoubtedly large doses given in the first twenty-four hours were frequently of great value, although they were very expensive. Treatment of peripheral failure was very unsatisfactory, so that it became necessary to prevent it when possible; to this end the earlier use of oxygen sometimes served. He thought hydrotherapy might be used more often. Glucose was sometimes useful. In streptococcal empyema simple aspiration occasionally sufficed, while closed drainage was frequently successful.

Dr. P. T. CHERRY said the general practitioner frequently had to treat his patients without hospital facilities. Punctures, he found, did tend to soothe some patients, and also most relatives. He agreed that after the diagnosis had been made further examination in the absence of

complications was inadvisable. Drainage operations, which at times had to be done in private houses, were frequently successful. He considered that diabetes delayed the healing of an empyema, and therefore demanded carbohydrates with sufficient insulin. He used heroin and Dover's powder extensively as sedatives.

Dr. I. B. JOSE stressed the necessity for delay until the formation of adhesions had occurred before operating. In his experience, patients were rarely referred to the surgeon until the empyema had been present for some weeks. Nevertheless an early diagnosis should be aimed at. Radiology was frequently of value in localizing an empyema.

SIR HENRY NEWLAND urged the necessity for identification of the rib to be excised. When the patient was in position for operation, access to the front of the chest was difficult. The safest method was to dissect the ribs from below upwards. It was just as important, he said, that the opening should not be too high or too low; if it was too high, the scapula would come down and interfere with drainage. He said that the description of the technique for closed drainage was very accurate. He made the point that it was possible to split the fibres of the *latissimus dorsi* longitudinally, in which case the wound on either side of the tube was likely to heal by first intention; this was contrary to what was found when the fibres were cut across. If in a case of pneumococcal empyema the large fibrinous masses could be removed without much air being let in, the problem of healing would then be very nearly solved. In some of his cases healing had resulted without further interference, while in others a collection of serum had subsequently had to be aspirated. However, a wide opening with consequent pneumothorax was sometimes unavoidable, and therefore the method was often inadvisable; but it did show the possibility of healing. The safety pin had been mentioned; he would go further and say that it was essential. Should a tube slip in, the first thing to do was to sit the patient up and try to grasp the tube with forceps; it was often wisest to examine the patient with the fluoroscopic screen. If necessary, operation should be performed.

Dr. P. S. MESSENT considered closed drainage after adhesions had formed the best method in young children with pneumococcal empyema; some authorities considered open drainage as good or better. In the latter operation the period of convalescence was lessened by the removal of large masses if there was not too much drainage. In adults open drainage was usually the method of election.

Dr. H. A. MCCOY said that X rays were very valuable, particularly in localizing interlobar collections. A lateral radiograph was essential for this. A sausage-shaped shadow was seen, and the site of election for the drainage opening could be chosen. The association of massive atelectasis with pneumonia was being discussed in America. The pictures of collapse and consolidation were somewhat similar, but in the former the whole area was involved and the heart moved over to the affected side. He asked whether this condition was common in South Australia. Better pictures could be obtained with the patient in the sitting position, especially if a fluid level was to be demonstrated.

Dr. L. R. MALLIN asked if the direct method of typing by adding sputum to serum on slides and looking for a halo was used in South Australia.

Dr. R. E. MAGAREY said that the probable reason that many of the patients operated on in private houses recovered was that their empyemata were of long standing and were well walled off by adhesions. He could testify to the relief afforded by morphine, as well as to the discomfort of a heavy poultice lying on the chest.

Dr. Sleeman, in reply, said he had seen only six cases of pericarditis in twelve years, and had detected no cases of massive atelectasis, but he would not say that none had occurred. Neufeld's method of typing was now being used, and the halo around the serum was emphasized by methylene blue. Typing could be carried out in twenty minutes.

Dr. McKay, in reply, said he did not intend to advocate closed drainage for empyemata as a whole, but in young children it had lowered the mortality, as was shown by large series of cases. An important part of treatment was to wait sufficiently long before operating. He agreed that as a routine method drainage by wide tube had been very successful. With regard to rib selection, if the arm was held at the side it was safe to use the rib below the angle of the scapula.

A MEETING of the New South Wales Branch of the British Medical Association was held at the Royal North Shore Hospital of Sydney on June 17, 1937. The meeting took the form of a series of clinical demonstrations by members of the honorary staff. Part of this report appeared in the issue of November 20, 1937.

Diabetes Mellitus.

Dr. W. W. INGRAM showed a woman, aged thirty-two years, who had been treated at the diabetic clinic at the hospital since September, 1931. She became pregnant in March, 1935. Throughout the pregnancy the diet of 1,900 calories was not altered. Blood sugar estimations were carried out frequently and the dose of insulin was adjusted accordingly. The amount of insulin given was increased from 37 units a day in March to 80 units a day in November. She was admitted to hospital on November 17, a few days before the expected date of her delivery. Four days later labour commenced and she was given an anti-ketogenic liquid diet of 1,700 calories and 20 units of insulin every six hours. During labour the blood sugar content rose to 330 milligrammes per 100 cubic centimetres, but after delivery rapidly fell to 90 milligrammes, and she showed signs of hypoglycemia. Orange juice was given and the insulin reduced to 60 units per day and then to 40 units per day three days after delivery.

The labour was normal in every respect and a healthy female infant was born. Recovery was uninterrupted and the child developed normally. The child was fed artificially.

The patient later returned to her diet of 1,900 calories and 40 units of insulin daily. Her condition remained satisfactory until February, 1937, when extra work was entailed in looking after the child. She found glycosuria was nearly always present at the time of rising. Extra insulin, taken at breakfast to overcome this, brought on hypoglycemic attacks at midday. In March, 1937, she was given 20 units of ordinary insulin in the morning and 26 units of Danish Leo insulin *retard* before the evening meal. At the time of the meeting she was very well.

Dr. Ingram next showed a man, aged forty-seven years, who had been admitted to hospital first in October, 1932, with severe *diabetes mellitus* and threatened coma. A diet of 2,200 calories and the administration of 45 units of insulin a day proved satisfactory. In August, 1933, his wife became ill and he neglected his diet. His condition deteriorated, but recovered when he was given a diet of 1,900 calories and 65 units of insulin a day. In July, 1934, after a drinking bout, he was admitted to hospital on the verge of coma. His dose of insulin had to be increased to 80 units a day. In July, 1934, he had a mild hypoglycemic attack and his insulin was reduced to 70 units daily. His urine remained free of sugar and acetone, and his weight remained constant until April, 1935, when he had a severe attack of influenza characterized by headache, nausea, slight cough, dyspnoea, perspiration and fever. On examination a mass of enlarged glands was discovered in the left axilla and left cervical region. Many of these were discrete and rubbery. There was no enlargement of the spleen or liver, and no other enlarged glands were found on palpation or by X rays. For nine days he had a raised temperature, sometimes to 40° C. (104° F.). His temperature was normal during the rest of his stay in hospital.

An enlarged gland was excised and reported on by Professor Keith Inglis as Hodgkin's disease. He was given a course of deep X ray therapy to the enlarged glands,

which disappeared; no enlarged glands had been detected since.

In September, 1935, he was admitted to hospital under the care of a surgeon. He then complained of acute abdominal pain and vomiting. His temperature was sub-normal and he was found to be in a precomatose condition. He did not admit breaking his dietary *régime*, although this was suspected. He left hospital taking 1,500 calories and 90 units of insulin daily. His diet was subsequently increased to 2,200 calories and his insulin was reduced to 70 units daily.

In May, 1937, he came to the diabetic clinic complaining of breathlessness. It was found that he had lost 6.3 kilograms (fourteen pounds) in weight and had been careless with his diet. He was admitted to hospital. For the six weeks prior to the meeting he had had a raised temperature, sometimes as high as 40° C. (104° F.). His liver was enlarged; but his spleen was not palpable. No enlarged glands could be felt. X ray examination of the chest revealed chronic bronchitic changes only and no enlarged glands. No enlarged glands were detected in the abdomen by X rays. No organisms were grown by blood culture. Blood examination revealed a mild secondary anaemia and a normal leucocyte count. At the time of the meeting his urine was free of sugar. He was taking a diet of 1,900 calories and 85 units of insulin daily. In spite of his fever he felt perfectly well.

Dr. Ingram next showed a boy, aged thirteen years, who had been admitted to hospital seven weeks previously. At the time of admission he had severe ketosis and hyperglycemia and was considerably undernourished. His blood sugar content at that time was 350 milligrammes per 100 cubic centimetres.

Dr. Ingram said that he had been kept in hospital longer than usual because his home was many miles from the nearest doctor, and it was therefore wise to educate him so that he could look after himself.

After three months in hospital he had gained considerably in weight. He was taking a diet of 1,700 calories and 51 units of insulin daily, given in three doses: 28 units in the morning, eight units at midday and 15 units in the evening. An attempt was made to change him over to zinc protamine insulin to lessen the number of injections. At first, 20 units of zinc protamine insulin only were given before breakfast. The diet was adjusted and he was given food at 4 p.m. and at 10 p.m., with the total number of calories as before. Glycosuria and hyperglycemia immediately appeared. On the eighth day ten units of ordinary insulin were given along with the zinc protamine insulin, without any improvement in his diabetic condition.

Four days later the dose of zinc protamine insulin was increased to 25 and five days later to 30 units (still along with 10 units of ordinary insulin). Ketosis again appeared, and three days later the dose of ordinary insulin was increased to 20 units. The ketosis disappeared; but the hyperglycemia remained. Ten days later the zinc protamine insulin was increased to 35 units and a few days later the ordinary insulin was increased to 25 units; but glycosuria and hyperglycemia remained. At the time of the meeting he was taking 60 units of insulin, of which 35 were of zinc protamine, and he had lost 1.8 kilograms (four pounds) in weight, although he felt perfectly well and had had no hypoglycemic symptoms. He was thus having nine units of insulin more than his stabilizing dose, and his diabetic condition was not satisfactory.

Dr. Ingram next showed a girl, aged five years, who had attended the diabetic clinic for twelve months, taking 10 units of insulin in the morning, 15 at midday, and 10 in the evening. She was admitted to hospital so that zinc protamine insulin might be administered with the object of reducing the number of injections. She was given 20 units of zinc protamine insulin only. Glycosuria and hyperglycemia recurred. At the end of a week five units of ordinary insulin and 20 units of zinc protamine insulin were given. At the time of the meeting she was receiving 20 units of zinc protamine insulin and 10 units of ordinary insulin. Her condition appeared to be satisfactory.

Dr. Ingram's last patient was a man, aged fifty-six years, who had attended the diabetic clinic for two years and had remained well while taking a diet of 2,200 calories and fifteen units of insulin three times a day. He was admitted to hospital. It was found that a dose of 25 units of zinc protamine insulin was sufficient to control his diabetes; but the patient said he felt better while taking ordinary insulin.

Chilblains.

Dr. S. H. SCOUGALL and Dr. V. M. COPPLESON showed a woman, aged twenty-two years, who had been treated for poliomyelitis at the Royal Alexandra Hospital for Children at the age of five years. In 1933, when aged eighteen years, she was admitted to the Royal North Shore Hospital, where various stabilization operations were performed on her lower limbs. In 1934 she began to walk with crutches. The following year disabling circulatory changes were noted in the lower limbs. An ulcer of the foot persisted for months in spite of treatment. Later in the year erysipelas of the right leg occurred. She continued to get chilblains, which tended to break down and form ulcers. These ulcers were very difficult to heal. The feet were very cold and had so-called chilblain circulation.

On April 6, 1936, left lumbar sympathectomy was performed by the posterior route. This resulted in a great improvement in the circulation in the left leg. The left foot became very much warmer than the right. On July 8, 1936, right lumbar sympathectomy was performed, the approach being by the transperitoneal route, as the posterior route was considered unsuitable. As a result there was an improvement in the condition of the right leg, the warmth and circulation becoming comparable with that in the left.

Carcinoma of the Parotid Gland.

Dr. HAROLD J. HAM showed a female patient, aged twenty-five years, who had come under his care on February 22, 1937. A local excision of a small parotid tumour on the left side had been done on December 22, 1936; but the tumour had recurred within two or three weeks. The pathological report on the excised tissue was: "Epithelial outgrowths infiltrating the gland and cell nest formation."

On February 23, 1937, there was a moderately hard circular mass in the left pre-auricular region, 2.5 centimetres in diameter, just above the scar of the previous excision. The mass was fixed to the deeper tissues but not to the skin.

On February 25, 1937, radium implantation was carried out, six two-milligramme needles and two one-milligramme needles being used over an area five centimetres square. The needles were left in for eight days and the dose was calculated as 6,300 γ r units. The result at the time of the meeting, three and a half months later, was satisfactory, the area about the scar being soft and no tumour being palpable. There was no facial paresis and no secondary glandular deposits had appeared.

Malignant Neoplasms of Face and Neck.

Dr. Ham also showed a male patient, aged seventy years, who had had four malignant lesions about the face and neck treated by radium simultaneously. There had been a large epithelioma of the skin in the left parotid region, which had been treated by the application of a radium "Stent" mould, 46 milligrammes of radium being applied at a distance of 2.0 centimetres from the skin for ten days, the dose being calculated as 6,500 γ r units.

There had been also basal-cell carcinomata of the skin of the upper lip on the right side, the right cheek and the back of the neck (the latter recurrent after excision), all of which had been treated by the implantation of radium needles.

Dr. Ham also showed a female patient, aged seventy-four years, who had had a large rodent ulcer of the middle of the forehead. This had been treated by a radium mould. At the time of the meeting the patient was still in the

reaction stage; but all malignant characteristics had now disappeared.

Chronic Traumatic Ulcer.

Dr. F. C. FLORANCE showed a patient, a diver, who had been bitten on the ankle seven months previously by a kingfish at Port Darwin. At the time of admission to hospital he was suffering from an ulcer 6.0 by 2.0 centimetres in size. This had healed completely after four applications of Unna's paste at intervals of one week.

Dermatitis Herpetiformis.

Dr. Florance also showed a patient suffering from dermatitis herpetiformis. The patient had been treated by arsenic medication, "Aolan", vaccine prepared from stools, autohaemotherapy, rest, dietetic treatment, and finally "Germanin", without success. This patient was shown by the courtesy of Dr. A. L. Dawson.

Acne Vulgaris.

Dr. Florance next showed two young women suffering from acne vulgaris. The first patient had been treated by local and dietetic measures plus superficial X radiation, three fractional doses of X rays at intervals of one week being given to the forehead, both cheeks and the chin.

The second patient had acne vulgaris of the disturbed menstrual type. Her skin condition was always worse before menstruation. This girl had been treated with "Antuitrin S" alone. She improved greatly after six injections of 1.0 cubic centimetre at intervals of four days without any other treatment.

Subdural Abscess and Lateral Sinus Thrombosis.

Dr. E. P. BLASHKI showed a male patient, aged seventeen years, who had been admitted to hospital on January 16, 1937, with a history of discharge from the right ear for several years. He had had severe pain in the ear and the mastoid region for one week, and stiffness of the neck for two days. At the time of admission he was comatose. The right ear was discharging pus freely. Head retraction was pronounced. The temperature was 38.6° C. (101.4° F.) and the pulse rate 104 per minute. A radical mastoid operation was performed immediately. An extradural abscess, about four centimetres in diameter, was found. The lateral sinus was thrombosed. The internal jugular vein was ligated and the sinus then exposed until clear of the thrombus. This required following the sinus to a distance of about two centimetres beyond the upper knee, and downwards as far as possible. The sinus was opened and the clot removed, the lateral wall of the sinus excised and the ends packed with gauze. Some of this could not be successfully removed for a period of two weeks.

The temperature had fallen to normal by January 19, and recovery was uneventful, except for some fever on January 26, due to pocketing of pus in the neck wound. A counter-opening was made in the neck, and progress continued without incident. The patient was discharged from hospital on February 24, 1937.

This patient was given two "Prontosil" tablets three times a day for four days after January 18 (the third day after operation). Dr. Blashki said that it was impossible to say how far this had influenced the result, as he had already made good progress. The cerebro-spinal fluid taken by lumbar puncture at the time of operation contained an increased quantity of globulin; there was no increase in the cell content.

Mastoid Fistula.

Dr. Blashki also showed a male child on whom he had performed a Schwarze operation for mastoiditis. He had subsequently returned to hospital with a high fever. No other cause could be found, and the wound was opened and searched until a radical mastoid operation had been done. Nothing was found to account for the fever. He subsequently had unexplained fever on several occasions. The

child did not seem ill; but his temperature sometimes rose to 40-6° C. (105° F.). It was reported that his father also had an unstable temperature control. Subsequent to the radical operation there was a large postaural fistula, which had been closed by the plastic operation of Ruttin.

Dr. Blashki said that in this operation the whole postaural area, including the fistula and scar, was excised so that the posterior edge of the wound lay on solid tissue and the anterior edge was anterior to the margin of the fistula. The skin and subcutaneous tissue were freed by blunt dissection on the back of the pinna until the wound could be approximated easily. The suture line must lie on solid tissue or immediate sloughing would take place.

Dr. Blashki's next patient was a male who had had several attacks of mastoiditis requiring operation until finally a radical mastoid operation had been done. This had resulted in a fistula. It was proposed to wait some time before attempting closure, because there was occasionally some discharge when the patient suffered from a cold.

Fracture of the Spine.

The honorary orthopaedic surgeons, Dr. S. H. SCUGALL, Dr. A. R. HAMILTON and Dr. A. L. DUCKER, showed a woman, aged thirty years, who had been admitted to hospital on March 5, 1935. Three and a half months previously she had been thrown out of a motor car, but did not remember the details. There was immediate paralysis of all four limbs, with a feeling of numbness in the body and tingling in the hands. Recovery of legs occurred twelve hours later, recovery of the right arm two days later. The left arm slowly improved, but a moderate degree of generalized paresis of it remained. There was severe pain in the right shoulder, which was worse when she stood up. She suffered from nausea and vomiting. She was two months pregnant. X ray examination of the left shoulder revealed no abnormality. X ray examination of the cervical region revealed a fracture-dislocation of the sixth and seventh cervical vertebrae. There was complete disruption of the arch of the seventh cervical vertebra on both sides at the pedicles. The sixth was observed to have a hinge movement on the seventh cervical vertebra. Calcium gluconate was given by injection, with the object of relieving the patient of her vomiting. Two weeks later curettage was performed. Glisson sling traction for control of the head and neck was employed. Plaster of Paris fixation was employed for four months during the period of Glisson sling traction. Practically complete recovery of motor function occurred, and the mild sensory symptoms disappeared.

After the removal of the plaster careful exercises were continued and the patient remained reasonably well for a further year, when she complained that after a minor illness or when she was tired her shoulder pain reappeared, accompanied by backache high in the dorsal region. These symptoms were aggravated after a confinement about this time. She was always relieved of pain by recumbency. X ray examination showed complete bony ankylosis of the sixth and seventh cervical vertebrae. There were slight atrophy of the right trapezius, levator scapulae and rhomboid muscles on the right side, and a moderate degree of scoliosis with the convexity to the left. Correction of the scoliosis gave no relief and there was no relief when the arm was placed in a sling. Exercises aggravated the pain. After three months her general condition improved greatly and she lost her pain in the shoulder and was able to carry out compensation exercises for scoliosis. If the right shoulder was depressed she had pain down the arm, cramp and numbness. Two years after the accident she was practically symptomless; but the scoliosis was still in evidence.

The second patient shown by the honorary orthopaedic surgeons was a man, aged forty-two years, who had been admitted to hospital on March 22, 1933. In October, 1932, he had fallen nine feet off a springboard and struck his head in falling. He had lost the use of both hands. He had been allowed out of bed after treatment for three months by immobilization between sand bags. Since then he had been losing power in his hands and complained of increasingly severe shooting pains in the right shoulder.

X ray examination revealed fracture-dislocation of the fifth cervical vertebra on the sixth. The body of the sixth cervical vertebra was displaced anteriorly. There was a fracture through the base of the lamina, extending through the bifid spine. The remaining lamina and half the spine were carried anteriorly and tilted upwards.

Halter traction was instituted, and motor power and sensation returned almost in full, although no change was made in the position of the bones as shown by X rays. At the end of six weeks he continued to suffer from severe pain in the shoulder and arm, which was not decreasing. Laminectomy was performed two weeks later, when the bone pressure on the cord was obvious; but it was necessary to remove the lamina above and below as well as the affected lamina before the cord became free. The spinal column then gave scant support to the head. A graft taken from the tibia was inserted to bridge across this area, and ultimately the man resumed his hard labouring occupation. He had since remained entirely free from pain.

The third patient shown by the honorary orthopaedic surgeons was a man, aged fifty-seven years, who had fallen from a scaffolding to the deck of a steamer on November 20, 1936. He had been recumbent for thirty-four days when admitted to the Royal North Shore Hospital. He complained of stiffness and grating in the neck. He had a Colles's fracture of the right forearm. There were no motor or sensory signs. Sling traction on his neck was maintained for three weeks with a weight of 2.25 kilograms (five pounds).

X ray examination at the time of admission revealed a fracture through the body of the fourth cervical vertebra, vertical in type, in the sagittal plane, with a forward displacement of the third and fourth cervical vertebrae. There was also a crack through the upper part of the body of the fifth cervical vertebra. After sling traction the lateral view of the spine showed excellent alignment. Plaster of Paris was applied to the head and thorax and was maintained for four months, when further X ray examination showed that alignment had been maintained.

The honorary orthopaedic surgeons also showed a man, aged forty-three years, who had been thrown on his head over the handle bars of a bicycle on September 13, 1934. Consciousness had been lost for five minutes. He was admitted to the Royal North Shore Hospital two days later, complaining of pain at the back of the head and neck. X ray examination revealed a fracture through the odontoid process, with posterior displacement of the process and the atlas. There was a fracture of the body of the second cervical vertebra, and there was a fracture through the neural arch of the atlas without displacement. There was also a fracture through the spinous processes of the seventh cervical and the first thoracic vertebrae.

A plaster cast was applied and kept in position for six months, during which time the patient had no symptoms. He had remained symptomless since the removal of the plaster.

The fifth patient shown by the honorary orthopaedic surgeons was a man who had been admitted to hospital on August 8, 1934, complaining of severe occipital pain, which was worse early in the day and became intermittent later, aggravated by active or passive movement; occasional slight loss of memory; stiffness of the neck in an attitude of flexion forward and to the right; giddiness if the head weight was not kept permanently supported, whether standing, sitting or lying; and nervousness. These symptoms were not entirely controlled by the wearing of a Thomas collar. X ray examination revealed that there had been a fracture through the base of the odontoid process, which had been displaced forwards about 0.6 centimetre (a quarter of an inch), together with the atlas. The atlas and the odontoid process were rotated to the right, and there was posterior displacement at the right articulation. There was no evidence of bony union. There was some localized osteoarthritis between the first and second thoracic vertebrae on the right side.

The honorary orthopaedic surgeons next discussed the case of a woman, aged fifty-nine years, who, on December 29, 1936,

had slid down the "slippery dip" at the Manly swimming pool to the sand. She had felt pain in her back, and about seven days later took to bed, feeling sick. Next day she sought the advice of a local medical practitioner on account of swelling of the abdomen and vomiting. At that time she had hematemesis, severe paralytic ileus, with a temperature of 37.8° C. (100° F.) and a pulse rate of 120 per minute. Although distension became pronounced, some bowel action was still being maintained. There was no interference with bladder function nor interference with motor or sensory distribution. A Jones double abduction frame in slight hyperextension was used; but the patient died two days later of mitral stenosis.

The honorary orthopaedic surgeons' seventh patient was a man, aged thirty-nine years, who had been admitted to hospital on February 6, 1936. He had had a slight amount of pain in the neck for a week after having fallen down some steps. The pain had slowly increased during the week. X ray examination revealed a fracture of the spinous process of the second cervical vertebra. No immobilization was carried out. At the end of two months the patient was free of symptoms.

Dislocation of the Spine.

The honorary orthopaedic surgeons next showed a man, aged twenty-eight years, who had been admitted to hospital on October 3, 1934, suffering from pain and stiffness in the neck. He had been in hospital six weeks previously, after a bicycle accident, but had not complained of any pain in his neck at that time. He had difficulty in turning his head to the right and had occasional tingling down the right arm. X ray examination revealed fracture of the spinous processes of the second and third cervical vertebrae and a forward dislocation of the third cervical vertebra on the fourth. Sling traction, with a weight of 4.05 kilograms (nine pounds), was applied, and at the end of one week tingling had disappeared from the left arm and pain had ceased. X ray examination a fortnight later showed that the dislocation had been partly reduced. Any increase in extension of the head again brought on tingling and spasmodic movement. At the end of six weeks a plaster jacket was applied, to include the chin, and the patient lost all symptoms. At the time of the meeting the patient was free of symptoms, although the reduction was not quite complete.

Gold Therapy in Arthritis.

The eighth patient shown by the honorary orthopaedic surgeons was a woman, aged sixty-five years, who had complained of pain and swelling at the metacarpophalangeal and proximal interphalangeal joints of both hands for some months before obtaining treatment. Examination revealed fusiform swellings of the metacarpophalangeal and proximal interphalangeal joints, particularly of the index and ring fingers, of both hands. There was tenderness at these joints on lateral pressure. Five infected teeth were removed. The patient was given a full diet, rich in vitamins. Diathermy was applied to the hands. After two months there was only slight improvement. A course of "Solgonal B Oleosum" was then given. At the end of the course the affected joints were free and painless and there was no tenderness on lateral pressure.

The honorary orthopaedic surgeons also showed a male patient, aged thirty-nine years, who had complained of pain and limitation of movement at the metacarpophalangeal and proximal interphalangeal joints, and at the wrists, elbows (particularly the right) and shoulders for some months. The symptoms had become more pronounced during this time.

No obvious focus of infection was found. The affected joints had the appearances typical of rheumatoid arthritis. There was considerable limitation of all movements at these joints. A full diet, rich in vitamins, was ordered and a course of "Solgonal B Oleosum" was given. At the time of the meeting there was no pain in the hands, movement was full and the grip was powerful. The elbow movements were almost full and accompanied by slight

pain only. The shoulder movements were full and caused slight pain at the limit of movement only. The patient had increased in weight by 9.5 kilograms (one and a half stone) since the commencement of treatment.

The next patient shown by the honorary orthopaedic surgeons was a woman, aged fifty-two years, who had complained of increasing pain and swelling in the left knee, left ankle, hands, elbows and shoulders over a period of twelve months. There was no obvious focus of infection. The affected joints had the appearances typical of rheumatoid arthritis. The left knee and left ankle were very tender and swollen. The left knee was encased in a plaster mould for some weeks, and a course of "Solgonal B Oleosum" was commenced. There was continuous gradual improvement. At the time of the meeting all joints were practically painless, and at most joints there was a full range of movement.

The honorary orthopaedic surgeons also showed a man, aged forty-four years, who had complained of pain and swelling of both feet and ankles for some weeks before coming under observation. The only possible focus of infection observed was a possibly septic tooth. This was removed. Both feet and ankles were swollen and oedematous, and pain was complained of on all movements at the ankle and tarsal joints. Plaster boots were applied and worn for about two months. On removal of these there was no pain or swelling in the right ankle, but still slight pain and swelling in the left. After about three months the swelling and pain reappeared. Plaster boots were reapplied for two weeks and a course of "Solgonal B Oleosum" was given. At the time of the meeting there was no pain or swelling in the feet or ankles. There was an intermittent slight pain in the region of the right elbow.

Congenital Absence of a Cervical Vertebra with Torticollis.

The last patient shown by the honorary orthopaedic surgeons was a girl, aged five years, who had been under treatment previously for congenital dislocation of the hip. She was seen again in 1935, when she was suffering from torticollis. She was operated upon in March, 1936. The sterno-mastoid muscle was divided in the ordinary manner; no plaster collar was applied. The deformity was not corrected by the operation, and a plaster collar was applied. It was kept in position for one month. When it was removed, the head returned to its former position. X ray examination of the cervical region showed absence of the body of the fourth cervical vertebra, without sclerosis. There was no reaction to the Mantoux test. The blood count was normal.

Peptic Ulcer.

Dr. E. A. R. Blich showed a woman, aged seventy-two years, who had been admitted to hospital on April 1, 1937. She had had paroxysms of pain in the epigastrium not related to meals nor relieved by food or alkalis during a period of three years. The pains had become more severe and persistent and there had been several vomiting attacks. She stated that she had lost about 12.5 kilograms (two stone) in weight in the previous three months. She had first been treated for peptic ulcer twenty years before and had had occasional periods of attacks of pain soon after meals ever since.

Examination revealed tenderness in the epigastrium and right hypochondrium, and resistance to deep palpation. No tumours were palpable.

X ray examination revealed a large, deep, chronic perforating ulcer in the lesser curvature of the stomach, in its middle third. There was an hour-glass constriction of the stomach at this level. The stomach emptied normally.

Operation was performed on April 28, 1937. An area of cicatrization in the lesser curvature of the stomach, to which the omentum was firmly adherent, was found. When the stomach was opened, a deep penetrating ulcer could be seen. The floor of the ulcer appeared to be formed by omentum. A collar of the stomach wall, about five centimetres (two inches) in width, was resected between

clamps. A section was cut to include the wall of the ulcer. Examination of this revealed inflammatory changes, extensive ulceration of the mucous membrane, great increase in fibrous tissue and endarteritis. There were inflammatory changes in the mucous membrane at the edge of the ulcer, also collections of inflammatory cells and formation of fibroblasts. There were changes in the lymphatic glands, but these were not malignant.

Dr. Bligh showed the portion of stomach that he had removed.

Multiple Hydatid Cysts of the Abdomen.

Dr. Bligh next showed a woman, aged twenty-five years, who had been admitted to hospital on February 12, 1937. She had complained of attacks of abdominal pain, varying in degree, and sometimes severe enough to double her up, for the previous two years. The pain was mainly in the epigastrium and around the umbilicus. Her abdomen became greatly distended during the attacks of pain. The umbilicus had become everted during the previous six months. The attacks occurred about once a month and lasted two or three hours. Nine months before admission to hospital she had had severe pain in the legs and had fainted. Her legs and feet had become very swollen and her body covered with a rash "like a lot of small blisters". She had also been very breathless at the time. The swelling had subsided in about four days and had not recurred.

At the time of admission to hospital the lower half of the abdomen was swollen. A large number of small, round, soft, apparently superficial swellings were palpable. In the left iliac fossa the lumps were readily palpable, and beneath them a large firm swelling could be felt. Beneath the skin in the epigastrium several small spherical tumours could be felt. The lower border of liver dullness was about 3.75 centimetres (one and a half inches) below the costal margin. There was no abdominal tenderness. A plain X ray examination of the abdomen, liver and chest revealed no hydatid cysts.

Operation was performed on February 24, 1937. Innumerable hydatid cysts were found scattered throughout the peritoneal cavity. The great omentum, which was filled with cysts, was resected from the stomach and colon. Multiple cysts were removed from the walls of the liver, stomach, spleen, small intestine and pelvic organs.

At a later date further cysts were removed from the pelvis and from around the spleen and liver. Cysts were still present in the gastro-hepatic, gastro-splenic and lienorenal ligaments and also in the broad ligaments. It was not thought advisable to remove these.

On March 19, 1937, the number of leucocytes was estimated at 11,700 per cubic millimetre. Of these, 47% were neutrophile cells, 31.5% lymphocytes, 3.5% monocytes, 17% eosinophile cells and 1% basophile cells.

Multiple Fractures of Spine, Sacrum and Pelvis.

Dr. Bligh also showed a man, aged twenty-six years, who had been admitted to hospital on January 10, 1936. On the day of admission a load of stone, weighing about 304 kilograms (six hundredweight) had fallen on him. At the time of admission he was in considerable pain. His legs felt stiff, but could be moved at will. There was no retention or incontinence or alteration in reflexes.

X ray examination revealed a fracture of the neural arch of the third lumbar vertebra, fracture of the right transverse processes of the first, second and third lumbar vertebrae, fracture of the left transverse processes of the fourth and fifth lumbar vertebrae, fracture of the left wing of the sacrum extending down the left side of the body of the sacrum, and fractures of both ischia and both pubic bones, with comminution and separation of fragments of the right pubic bone.

On January 22, 1936, the patient was placed in a plaster jacket extending from the upper lumbar region to below the knees, with the thighs abducted; but he became so restless and irritable that it had to be removed. Purely palliative treatment was then used. By March 23, 1936, the patient was able to walk with a slight limp.

Mediastinal Dermoid.

Dr. V. M. COPPLESON showed a girl, aged ten years, who had had pneumonia, followed by pleurisy, eighteen months before admission to the Royal North Shore Hospital. A large quantity of fluid had been removed.

X ray examination of the chest showed a large tumour of the mediastinum, situated above the heart on the left side; on the wall of this a tooth could be seen.

At operation the second and third costal cartilages were removed and the tumour was completely removed. Post-operative recovery was rapid and uninterrupted.

Examination of the tumour showed it to be a dermoid cyst, which was almost completely filled with long hair and in the wall of which a rudimentary tooth was found.

Tumour due to Torula Infection.

Dr. Coppleson also showed a female patient who had been admitted to hospital complaining of soreness over the ribs on the right side.

Physical examination showed a palpable tumour on the ninth rib, in the axillary line, of softish consistency. Both liver and spleen were greatly enlarged. Examination of the blood revealed no abnormality beyond a low colour index.

X ray examination revealed some necrosis of the ninth rib on the right side. It was thought to be probably a metastatic lesion or osteomyelitis. Her temperature was raised and fluctuated between 36.9° C. (98.4° F.) and 37.8° C. (100° F.).

The affected portion of rib and the swelling were removed. The tissue was soft and fleshy. Pathological examination of the tissue showed it to be a breaking-down granuloma containing large epithelial cells and giant cells, in which yeast cells were found. These were cultured separately.

Dr. Coppleson said that the case was one of Gilchrist's disease and would be reported in full later by Dr. Prior and Miss Rickard.

(To be continued.)

NOMINATIONS AND ELECTIONS.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Baillie-Newton, Pauline, M.B., B.S., 1935 (Univ. Sydney), 84, Muston Street, Mosman.

Thoms, John Allan, M.B., 1927 (Univ. Sydney), City Health Department, Town Hall, Sydney.

The undermentioned has applied for election as a member of the South Australian Branch of the British Medical Association:

Bonnin, Noel James, M.B., B.S. (Univ. Adelaide), F.R.C.S.

Post-Graduate Work.

LECTURES IN SYDNEY.

THE New South Wales Post-Graduate Committee in Medicine announces that it has arranged for the following two lectures to be delivered in the Maitland Lecture Theatre, Sydney Hospital, at 8.15 p.m., as follows:

Wednesday, December 8.—Professor A. St. G. Huggett: "Recent Advances in Prenatal Physiology".

Thursday, December 9.—Mr. C. P. G. Wakeley, F.R.C.S.: "The Problem of the Gall-Bladder".

The fee for the two lectures is 10s. 6d., and for a single lecture 7s. 6d. Application for tickets should be made to the Secretary, New South Wales Post-Graduate Committee in Medicine, University of Sydney.

GENERAL REVISION COURSE, 1938.

THE New South Wales Post-Graduate Committee in Medicine announces that the general revision course, 1938, will be held in April in lieu of June as in previous years. The course will begin on Monday, April 4, and end on Thursday, April 14.

The fees are as follows: full course, three guineas; one week only, two guineas; mornings or afternoons only, two guineas.

Application to attend the course should be made to the Secretary, New South Wales Post-Graduate Committee in Medicine, University of Sydney.

The full programme will be published at a later date.

Obituary.

HARRY SWIFT.

WE are indebted to Sir Henry Newland for the following account of the career of the late Dr. Harry Swift.

The death of Dr. Harry Swift in his eightieth year has rendered almost extinct the gifted galaxy of medical men who during the latter part of the nineteenth century and the earlier part of the twentieth raised the practice of medicine and medical morality in Adelaide to a high plane. Their influence and example could not fail to be priceless and enduring value to the medical school founded in the early eighties. There are many graduates today who remember with gratitude the debt they owe to those men.

Dr. Swift was born at Ely, Cambridgeshire, on August 7, 1858. He was educated at King's School in that town, and afterwards went to Gonville and Caius College. He took a B.A. honours degree in the natural science tripos and then entered at Saint George's Hospital, London. He obtained the M.B. degree at Cambridge in June, 1883, and the M.D. in 1887. During 1885 and 1886 he was a resident medical officer at the Great Ormond Street Hospital for Children. It was there doubtless that he acquired his leaning towards the diseases of children and his undoubted capacity for handling the young. Little children seemed instinctively to take to him and trust him. Dr. Swift arrived in Adelaide in December, 1887, and entered into partnership with the late Dr. Charles Todd. Three years later he began practice on his own account. In addition he held many hospital appointments during his long and busy life. The knowledge he had acquired at Great Ormond Street no doubt led to his appointment in 1890 to the honorary medical staff of the Adelaide Children's Hospital. After twenty-eight years' active service he was appointed a consulting physician. He was also elected a vice-president, and his services to the hospital were recognized by the conferment of a life-governorship. For several years Dr. Swift visited the hospital every morning and acted as general adviser and father to the institution that was so dear to him. In 1891 he was appointed an assistant physician to the Adelaide Hospital and afterwards had charge of the skin department for many years. He became full physician in 1910 and held this position when he was made a consulting physician to the hospital. From the date of his first hospital appointment Dr. Swift imparted clinical instruction based on a rich store of medical knowledge. In 1912 he was appointed the first clinical lecturer in the medical diseases of children in the University of Adelaide, and in 1914 a clinical lecturer in medicine. In the following year, upon the retirement of Sir Joseph Verco, he succeeded him as lecturer in the principles and practice of medicine, a position which he held until his retirement in 1922. He was Dean of the Faculty of Medicine from 1924 to 1926.

In 1914 Dr. Swift contributed a paper to the proceedings of the Australasian Medical Congress in New Zealand, in which he described a new disease in children. He gave it

the name of erythredema. This piece of original clinical work gave him an international reputation, and the disease is nowadays more commonly known as "the pink disease" or Swift's disease. In addition to this notable piece of work he contributed many articles to medical journals.

Dr. Swift was honorary secretary of the South Australian Branch of the British Medical Association from 1893 to 1897, and was president in 1898-1899. He was one of the founders of the Medical Defence Association. He was always most keenly interested in its activities and was president for many years. On his retirement in 1927 he was presented with a silver rose bowl by the members as a token of esteem and in appreciation of his great services.

At sport Dr. Swift excelled. At Cambridge he was a good oar; he was captain of the Caius Boat Club and he rowed in the university trial eights in 1879. He was also a fine golfer and won the championship of the Royal Adelaide Golf Club five years in succession. He was a great follower of cricket and was himself a graceful bat and something of a slow bowler. He seldom failed to see a part of every interstate and test match. Many of his friends (including the writer) remember the happy hours they spent at the practice net behind his house in Victoria Square. He always loved a good horse. He dressed well, and as his horse and high gig were equally well turned out, he cut a distinguished figure until the advent of the motor car sounded the knell of horse and good dressing alike. During the whole of his long professional life Dr. Swift ever strove to uphold the dignity of his profession. Most of us have some failing or another, and, despite the injunction *de mortuis nihil nisi bonum*, it must be confessed that a veneer of irascibility tended at times to obscure a disposition by nature kindly.

In 1890 he married the youngest daughter of the late Joseph Peacock, who was his inseparable companion and she survives him. He had three sons. The youngest fell in France in the Great War. The eldest son is an electrical engineer in London, and the second is Dr. Brian Swift, who is practising as a gynaecologist in Adelaide.

JAMES VERNON McCREERY.

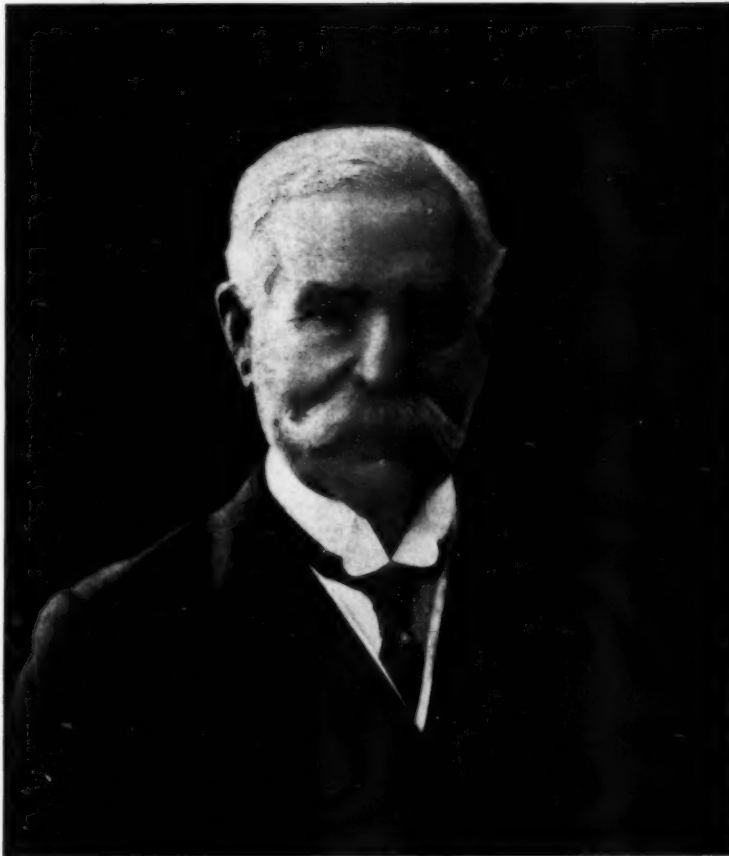
WE regret to announce the death of Dr. James Vernon McCreery, which occurred on November 14, 1937, at Kew, Victoria.

Correspondence.

SCHIZOPHRENIA AND ITS TREATMENT BY INSULIN AND "CARDIAZOL".

SIR: Under this heading in your issue of November 13, after four years of welcome silence, Dr. Sydney Pern, patron saint of the streptococcus, returns to his defence of the rôle of focal sepsis in the ætiology of disease and ensnares me in words of condemnation. As a criticism of the article referred to, his letter lacks point; for, though I had merely endeavoured to bring to wider notice the latest methods used in the treatment of schizophrenia, it would seem that through omission I had provided him with an excuse to trot out his tonsillar totem and once again acquaint the long-suffering world with the peregrinations of the sinister streptococcus. And, fearful lest those of tenderer years, forgetting focal sepsis, should essay the casting out of devils by "Cardiazol" or be beguiled by insulin's insouciant powers, Dr. Pern would have them know that among other and better methods of healing schizophrenic patients there is the eradication of these corrupting cocci. Alas for my ignorance!

The Bible tells me to go to the ant, to consider her ways and be wise; but, more scientific than Solomon, Dr. Pern directs my attention to the streptococcus, for "that way madness lies"! I turn to one of the latest works from



Harry Swift.

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America (the home of the streptococcal enthusiasts) on schizophrenia, an investigation by the Association for Research in Nervous and Mental Diseases, and I find focal sepsis dismissed in a few lines: "On the other hand, it is the more general experience that the removal of foci of infection frequently has no marked influence upon the course of psychotic illnesses" (page 298). I search in vain through the "Year Books (1935-1936) of Neurology and Psychiatry". I refer to the English text-book of Henderson and Gillespie (Oxford, 1932) only to find that Cotton's work on focal sepsis "has been most carefully controlled by Kopeloff, Cheney and Kirby, and his results have not been confirmed" (page 192). In fact in the researches of Kopeloff and Kirby, those schizophrenic cases which received operative treatment for infection of teeth, tonsils, cervix *et cetera* did less well than those cases where operation was withheld (pages 55-56). A thorough search of the latest text-book, "Psychiatry for Practitioners" (Oxford, 1936) failed to yield any reference to the subject of schizophrenia and focal infection other than the commonsense statement that "any associated organic morbidity of importance, even though it did not seem to be even remotely connected with the psychosis, should be thoroughly treated". Shakespeare knew how futile it was to endeavour to "fetter strong madness in a silken thread"; and in a like manner the modern psychiatrist has come to realize that in the eradication of septic foci he has a therapeutic aid scarcely more valuable and far less poetic.

From time to time psychiatric literature is adorned (if not enriched) by the spectacular claims of those who believe they have found the origin of madness in a microbe. With the enthusiasm of alchemists who search for the philosopher's stone, they ransack body and brain for the culpable coccus. Many come under the spell of their endeavours; but those who, like Dr. Sydney Pern, have become enslaved by "the base authority from others' books", seem to me to have lost that critical sense so important in the practice of medicine, and to "know not Lucan's dross from Virgil's gold".

Dr. Pern reminds me that bacteria gain entrance to the blood stream and that the brain is supplied with blood. This profound yet elementary assertion does not establish streptococcal infection as a cause of schizophrenia.

Yours, etc.,

REG. S. ELLERY.

33, Collins Street,
Melbourne,
November 15, 1937.

UNUNITED FRACTURES.

SIR: The following suggestions have been in the writer's mind for some considerable time, but as ununiting fractures are not common these days, he has not had the chance to put them into practice. He therefore puts them forward, for what they are worth, in the hope that someone with more opportunities will test them.

The usual procedure in bone grafting is first of all to prepare the site of non-union. The fragments are freed from fibrous tissue, the end freshened and a bed is cut for the graft. From another bone, usually the tibia, the graft is then cut and immediately transferred. The weakness of this operation is that the broken bone has already shown itself unable to heal, its blood supply has been lessened by fibrosis and the bones themselves are probably atrophic from disuse. This type of bone is bound to find difficulty in "vitalizing" and supporting a large inert graft. It is no wonder that the operation often fails.

What is suggested is that the operation be divided into two stages. In the first stage the graft is prepared but not removed. The usual four cuts are made. A thin osteotome is inserted and the graft is gently "rocked" to free the sides and ends, but not sufficiently to separate the graft from the medulla. In this way an artificial fracture is created. Immediately the mechanism for repairing a

fracture is put into action. Granulation tissue is passed across the cuts and large numbers of bone-repairing cells are mobilized in the area around the graft and in the graft itself. The process leading to bone repair advances. When this process has advanced sufficiently to be very active, the second stage is undertaken and the graft is shifted. It would probably require a little experimenting to discover the best time to shift the graft, but it would probably be between ten to fourteen days. At this time the site of non-union is prepared as usual, the flap over the tibia is reopened, the graft shifted and fixed and the wound closed. If it is feasible, it would probably be best to prepare the bed for the graft at the time of the first stage. In this way both parties to the graft would be well prepared before the final attempt at union is carried out. If this were done, however, shortening or some other deformity might result. Judgement would be needed in the individual case.

The difference between the ordinary and the suggested operation might be compared with the difference between taking a repair train to the scene of an accident with all apparatus ready but with no crew to work it, and taking the same train and apparatus with a full crew of workers.

On the same principle the following suggestion is made in regard to fractures of the neck of the femur. A large trephine hole is made into the upper end of the tibia and the cortex lifted. The medulla is then thoroughly broken up and the fragments left *in situ*. The cortex is replaced. Fourteen days or so later a large bore needle, say about a quarter of an inch in diameter, is passed between the broken ends of the femoral neck, external rotation being, of course, necessary. X ray photographs are taken to make certain that the end of the needle is between the fragments. The trephine into the tibia is then lifted, and with a powerful syringe the contents of the space in the medulla are now sucked out. The syringe is at once fitted onto the needle in the fracture site and its contents injected between the broken ends. If successful at all, this procedure would probably only be successful with recent fractures, as the fibrosis in old fractures would possibly prevent new bone formation. However, some of the cells present during bone repair must have very strong dissolving powers.

The procedure outlined for the neck of the femur could also be used in conjunction with Böhler's plan for drilling the bone in delayed union. (Böhler, "Treatment of Fractures", 1935, page 95.)

If anyone sees fit to test these suggestions I should be very interested to hear the results.

Yours, etc.,

C. CRAIG, M.D., M.S.

Launceston,
November 16, 1937.

CHRISTMAS APPEAL.

SIR: The council, in issuing its annual Christmas appeal to the members of the medical profession in New South Wales, feels that some explanation is desirable. The financial assistance rendered beneficiaries in the course of the year barely serves for the bare necessities of life. It is felt that at this season of the year something more is called for. In some cases the money is used for the purchase of much-needed new clothing, but no inquiry whatever is made into how the money is spent. Members of the profession may rest assured that proper use is made of the money voted.

Yours, etc.,

J. M. GILL,

Honorary Secretary.

The Medical Benevolent Association of
New South Wales,
135, Macquarie Street,
Sydney,
November 19, 1937.

Proceedings of the Australian Medical Boards.

QUEENSLAND.

THE undermentioned has been registered, pursuant to the provisions of *The Medical Acts, 1925 to 1935*, of Queensland, as a duly qualified medical practitioner:

Sharland, Andrew Alexander, M.B., B.S., 1933 (Univ. Sydney), Mackay.

Books Received.

THE HAIR AND SCALP: A CLINICAL STUDY (WITH A CHAPTER ON HIRSUTIES), by A. Savill, M.A., M.D., M.R.C.P.I.; Second Edition; 1937. London: Edward Arnold and Company. Demy 8vo, pp. 317, with illustrations. Price: 12s. 6d. net.

THE LABORATORY DIAGNOSIS OF SYPHILIS. THE THEORY, TECHNIC AND CLINICAL INTERPRETATION OF THE WASSERMANN AND FLOCCULATION TESTS WITH SERUM AND SPINAL FLUID, by H. Eagle, M.D., with a foreword by J. E. Moore, M.D.; 1937. St. Louis: The C. V. Mosby Company; Melbourne: W. Ramsay (Surgical) Proprietary Limited. Medium 8vo, pp. 446, with illustrations. Price: 30s. net.

THE DIABETIC ABC: A PRACTICAL BOOK FOR PATIENTS AND NURSES, by R. D. Lawrence, M.A., M.D., F.R.C.P.; Fifth Edition; 1937. London: H. K. Lewis and Company Limited. Demy 8vo, pp. 71. Price: 3s. 6d. net.

Diary for the Month.

- DEC. 1.—Western Australian Branch, B.M.A.: Council.
 DEC. 2.—South Australian Branch, B.M.A.: Council.
 DEC. 7.—Tasmanian Branch, B.M.A.: Council.
 DEC. 7.—New South Wales Branch, B.M.A.: Organization and Science Committee.
 DEC. 7.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
 DEC. 9.—New South Wales Branch, B.M.A.: Branch.
 DEC. 10.—Queensland Branch, B.M.A.: Annual Meeting.
 DEC. 14.—Tasmanian Branch, B.M.A.: Branch.
 DEC. 14.—New South Wales Branch, B.M.A.: Ethics Committee.
 DEC. 15.—Western Australian Branch, B.M.A.: Branch.
 DEC. 17.—Queensland Branch, B.M.A.: Council.
 DEC. 21.—Tasmanian Branch, B.M.A.: Council.
 DEC. 21.—New South Wales Branch, B.M.A.: Medical Politics Committee.
 DEC. 30.—South Australian Branch, B.M.A.: Branch.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," pages xviii to xxi.

- ALFRED HOSPITAL, PRAHRAN, VICTORIA: Honorary Physician to Out-Patients.
 AUSTIN HOSPITAL FOR CANCER AND CHRONIC DISEASES, HEIDELBERG, VICTORIA: Honorary Assistant Physician.
 BRISBANE AND SOUTH COAST HOSPITALS BOARD, QUEENSLAND: Honorary Officers.
 FREMANTLE HOSPITAL, FREMANTLE, WESTERN AUSTRALIA: Resident Medical Officer.
 MACKAY HOSPITALS BOARD, MACKAY, QUEENSLAND: Resident Medical Superintendent.
 MARYBOROUGH HOSPITALS BOARD, MARYBOROUGH, QUEENSLAND: Junior Resident Medical Officer.
 ROYAL MELBOURNE HOSPITAL, MELBOURNE, VICTORIA: Honorary Officers.
 ROYAL NORTH SHORE HOSPITAL OF SYDNEY, NEW SOUTH WALES: Honorary Officers.
 ST. GEORGE DISTRICT HOSPITAL, KOGARAH, NEW SOUTH WALES: Resident Medical Officers.
 THE TOWNSVILLE HOSPITALS' BOARD, TOWNSVILLE, QUEENSLAND: Resident Medical Officers.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135 Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phoenix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. House, 325, Wickham Terrace, Brisbane, B.17	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL, are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 178 North Terrace, Adelaide.	All Lodge appointments in South Australia. All contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 395, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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